Manitoba

Annual Report 1987 - 88

Manitoba Health Services Commission

Laboratory and X-Ray Services

April 1, 1987 — March 31, 1988

TABLE OF CONTENTS

	PAGE
MESSAGE FROM THE DIRECTOR	1
CPL 90th BIRTHDAY CELEBRATION	3
SENIOR STAFF LISTING	4
PERSONNEL REPORT	5
EXTERNAL COMMITTEE ACTIVITIES	7
CADHAM PROVINCIAL LABORATORY	
Workload Statistics	10
Administrative Services	11
Clinical Microbiology	13
Virus Detection	19
Environmental Microbiology	23
Serology/Parasitology	33
Technical Support Services	56
Metabolic Diseases/Chemistry	59
Infection Control Program	63
RURAL LABORATORY AND X-RAY UNITS	64
EDUCATION	
Laboratory Medicine	75
Radiology	83

LABORATORY AND X-RAY SERVICES DIVISION

DIVISIONAL YEAR END REPORT

Our primary goal continues to be the provision of excellent diagnostic service throughout the Province. One of the major facets of such service is the timeliness of the results, which has been improved throughout rural Manitoba in the past year by electronic reporting. While there have been intermittent technical difficulties with the system, we believe that this is the correct direction, and that future technical improvements will further enhance the quality of electronically transmitted reports. We also continue to place a very great importance on the quality of diagnostic determinants, another major facet of excellent service. A highlight of these activities follows.

At the Cadham Provincial Laboratory, we have two staff whose major functions are the establishment and co-ordination of laboratory quality control (Q.C.) activities throughout the Division. Specimens from diagnostic manufacturers and external agencies (College of American Pathologists, Laboratory Centre for Disease Control, Ottawa, and Centers for Disease Control, Atlanta) or internally generated blind QC specimens are regularly processed through all laboratory sections and all rural units. Quality control activities have been established this past year for rural "bedside testing" activities. Results are tabulated and reviewed monthly, through the LAXUS administrative network for rural Manitoba, and at the CPL Q.C. Committee, which is represented by all laboratory sections. Extensive applied research for improved diagnostic methods is conducted to produce better quality and more timely results in both laboratory testing and diagnostic imaging. LAXUS continues Quality Assurance and QC programs in diagnostic imaging that were initiated formally in 1981. Since that time, developing refinements to the system have resulted in a complete, thorough and ongoing assessment of x-ray machines and film processors. At three levels of complexity, daily, weekly, and semi-annual protocols are followed to ensure that all parameters remain within well-defined limits. On-site technologists, selected Area technologists, and the Regional Supervisors all participate in the maintenance of the overall program. In addition to well trained technical staff, we have modern equipment backed up with maintenance service contracts. Furthermore, an annual inspection of all 127 x-ray machines in the LAXUS inventory is conducted by the Radiation Protection Division of the Manitoba Cancer Treatment and Research Foundation. With the rural diagnostic network through LAXUS, we have been fortunate to have the flexibility of moving trained staff and laboratory equipment from centre to centre in times of need. Divisional centralization has many additional quality advantages (and cost-saving benefits) in bulk purchase of tested lots of reagents and use of standardized equipment.

In addition to timeliness and quality of service, another major factor is relevance. We aim to encourage direct user input and

collaborative studies. At the CPL, we also have input through the Manitoba Advisory Committee on Infectious Diseases, and through the Perinatal Screening Committee. Other input and reviews of activities are through the Management Committee of MHSC, reporting to the Commission Board. Some of our major initiatives in new activities in recent years have been the following: Chlamydia diagnosis and screening programs, AIDS virus diagnosis and seroprevalence studies, evaluation of new methods for detection of papillomaviruses and the rapid diagnosis of other virus infections, development of alpha feto protein (AFP) testing for neural tube defect detection and of algorithms and lab standardization of cholesterol testing, and the development of improved detection and analytic methods for organisms associated with community and institutional outbreaks. These activities represent essential diagnostic support for many of the major public health issues of current times.

We also recognize the need to review critically the use of diagnostic services, and studies are planned for the coming year through the Demonstration Project Fund to review trends and make recommendations in the utilization of diagnostic services.

In addition, we require good professional guidance and leadership. We are pleased that Dr. D. McEwan (former head of the Department of Radiology, University of Manitoba and past president of the Radiological Society of North America) has agreed to serve as a Consultant to the Division. His mandate will be to provide professional advice on all aspects of diagnostic imaging, with an emphasis on liaison with radiologists in rural Manitoba. We are also pleased to welcome Dr. M. Dawood, who joins the Virus Detection Section as a Scientist with a major focus to developing human retrovirus diagnostic capabilities. This is a rapidly emerging area of public health microbiology and we look forward to Dr. Dawood's progress in this area.

We intend that the above efforts will assist us in achieving a Divisional goal of "Quality and Service".

CADHAM PROVINCIAL LABORATORY

90th BIRTHDAY CELEBRATION

On Friday, December 4th, 1987, CPL Staff, invited dignitaries, friends and old-timers gathered at the CPL to celebrate its 90th Anniversary.

The Cadham Provincial Laboratory had its origin in 1897, when Dr. Gordon Bell was first appointed as Provincial Bacteriologist. Dr. Fred T. Cadham succeeded Gordon Bell in 1923 and was Director of the Laboratory until 1947.

Many displays and memorabilia were put together. All revolved around our theme "Public Health, Now and Then", and highlighted some of the accomplishments of CPL Staff since 1897.

From the gathered memorabilia, an "embryonic CPL Archives" has been developed. It is our intention to expand these Archives and that they may capture a valuable store of information relative to our first century of service by 1997.

LABORATORY AND X-RAY SERVICES DIVISION

SENIOR STAFF LISTING 1987-1988

DIVISION DIRECTOR: G. W. Hammond, M.D., FRCP(C) (Int. Med., Med. Micro., Inf. Diseases)

LABORATORY PHYSICIANS:

J. G. Fox, M.D., FRCP(C) (Path.), Dip. Bact. (Tor),
L. H. Sekla, M.B., B.Ch., DTM&H, D.M., Ph.D.,
T. W. Williams, M.B., B.Ch., DPH, FRCP(C) (Ped. & Med. Micro.)

MANAGER, RURAL UNITS: M. W. Burroughs, FCAMRT, A.C.(R), R.C.T.

ADMINISTRATIVE OFFICER, CPL: J. M. Matthews

SCIENTISTS, CPL:

G. Ahluwalia, B.Sc.,
D. E. Gelskey, M.S., MPH, Dr. PH.,
A. C. Maniar, M.Sc., Ph.D., D.Sc.,
P. McNicol, B.Sc., Ph.D.
W. Stackiw, B.Sc.
R. Thompson, B.Sc., R.T.

REGIONAL SUPERVISORS, RURAL UNITS

EASTERN MANITOBA: X-RAY - L. Wilson, R.T., R.C.T.
LABORATORY - Wm. Strukoff, DHA, R.T.

WESTERN MANITOBA: X-RAY - E. Carroll, R.T., R.C.T.
LABORATORY - W. Yaschyshyn, R.T.

NURSE EPIDEMIOLOGIST: D. Phippen, Reg.N., B.A., C.I.C.

DIVISION SPECIALIST TECHNOLOGIST: S. Giercke, A.R.T.

EDUCATION OFFICERS

X-RAY: J. D. Brownlee, B.Sc., R.T.
LABORATORY: A. N. C. Delaat, A.R.T.

DIVISION ACCOUNTING CLERK: C. McComber

LABORATORY AND X-RAY SERVICES DIVISION

PERSONNEL REPORT
April 1st, 1987-March 31st, 1988

During this fiscal year, the Division welcomed new staff:

Linda Boaz	- Eriksdale Lab & X-ray Unit
Doreen Brugghe	- Treherne Lab & X-ray Unit
Dr. M. Dawood	- Virus Detection Section, CPL
Yolande Fenez	- Pine Falls Lab & X-ray Unit
Barbara Knapp	- Data Entry Section, CPL
Diane Koss	- Roblin Lab & X-ray Unit
Marilyn Kroeker	- Killarney Lab & X-ray Unit
Geraldine McDonald	- Swan River Lab & X-ray Unit
Dr. Grant McLarty	- Virus Detection Section, CPL
Lorraine Meilleur	- Media Section, CPL
Shelley Olsen	- Teulon Lab & X-ray Unit
Tracey Peters	- Serology Section, CPL
Irma Recksiedler	- Altona Lab & X-ray Unit
Denise Rosteski	- Minnedosa Lab & X-ray Unit
Rita Smith	- Teulon Lab & X-ray Unit
Lorie Tandberg	- Data Entry Section, CPL
Leona Tetrault	- Emerson Lab & X-ray Unit
Monika Wassmuth	- Killarney Lab & X-ray Unit
Murray Werbeniuk	- Environmental Microbiology Section, CPL

Retirements

Sr. Ignatius Zentner	- Winnipegosis Lab & X-ray Unit
Cornelius Petkau	- Morden Lab & X-ray Unit

Resignations

Evelyn Beard	- Winnipegosis Lab & X-ray Unit
Donna Coulson	- Hamiota Lab & X-ray Unit
Diane Hinch	- Minnedosa Lab & X-ray Unit
Pamela Johansen	- Media Section, CPL
Dr. G. McLarty	- Virus Detection Section, CPL
Pat Metcalfe	- Treherne Lab & X-ray Unit
Brenda Mitchell	- Data Entry Section, CPL
Marilou O'Halloran	- Clinical Microbiology Section, CPL
Glenda Wall	- Winkler Lab & X-ray Unit

Transfers out of the Laboratory and X-ray Services Division

Connie Merke	- To Manitoba Health Services Commission, 599 Empress St., Winnipeg.
Colleen Preston	- To Manitoba Health Services Commission, 599 Empress St., Winnipeg.
Tammy Shipiruk	- To the Department of Environment and Workplace Safety and Health.

Promotions

Patricia Bird	- MG2, Metabolic Diseases/Chemistry Section, CPL, October 24, 1987.
Sheila Bokor	- LA2, Gladstone Lab & X-ray Unit, May 11, 1987.
Paulette Carriere	- MG1, Virus Detection Section, CPL, March 28, 1987.
Elizabeth Stockl	- MG4, Metabolic Diseases/Chemistry Section, CPL, June 13, 1987.
Leona Tetrault	- MG2, Emerson Lab & X-ray Unit, January 5, 1987.
Robert Thompson	- Scientist 1, Metabolic Diseases/Chemistry Section, CPL, June 27, 1987.

LABORATORY AND X-RAY SERVICES DIVISION

EXTERNAL COMMITTEE ACTIVITIES OF STAFF - 1987/1988

Mr. L. Baker
- President - Manitoba Society of Medical Laboratory Technologists

Mr. J. D. Brownlee:
- Manitoba Association of Medical Radiological Technologists
- Chairman - Faculty Liaison Committee
- Post Graduate Chairman
- Chairman of Constitution and Bylaws
- Parliamentarian

Mr. M. W. Burroughs:
- Member - Medical Radiological Technology Advisory Committee, Red River Community College
- Member - Program Liaison Committee, Red River Community College
- Secretary - Provincial Ultrasound Advisory Committee
- Member - Advisory Committee - Low Osmolar Contrast Media

Mr. A. N. C. Delaat
- Continuing Education Director - Manitoba Society of Medical Laboratory Technologists
- Member - Advisory Council - Med. Lab. Technology Program - Red River Community College
- Member - Biological Technology Program - Red River Community College
- Member - Seconded Trainers Committee - Development and Training - Civil Service Commission Manitoba
- Chairman - Health Component Exectuive - MGEA
- Member - Advisory Committee - Med. Laboratory Sciences Certificate Program - University of Manitoba
- Member - Rural Hospital Steering Committee on Computer Information Systems

Dr. J. G. Fox
- Member - Perinatal Screening Committee

Dr. J. Fox (cont'd)	- Member - Alpha Feto Protein Consultant's Group
	- Member - Medical Laboratory Technical Advisory Committee
	- Member - Biohazard's Committee
	- Member - Manitoba Advisory Committee on Infectious Diseases (MACID)
Dr. D. Gelskey	- Vice-Chairman - Education Committee, Manitoba Heart Foundation
	- Chairman - Manitoba Hypertension Coalition Steering Committee
	- Member - Undergraduate Medical Education Committee, University of Manitoba
	- Member - Working Committee for World Health Organization Collaborating Centre, University of Manitoba
	- Chairman - Hypertension Action Plan Working Committee
Ms. S. Gribben	- Mailing Director, Winnipeg Academy of the C.S.L.T.
Dr. G. W. Hammond	- Member - National Advisory Committee on Immunization
	- Member - Technical Advisory Committee to Laboratory Centre for Disease Control, Ottawa
	- Member - Specialty Committee in Medical Microbiology, Royal College of Physicians and Surgeons of Canada
	- Member - Manitoba Advisory Committee on Infectious Diseases
Ms. D. Phippen	- Steering Committee for Infection Control Guidelines. Bureau of Communicable Disease Epidemiology, Laboratory Centre for Disease Control, Health and Welfare Canada
	- Working Group on the Revision of Infection Control Guidelines, Section I: Prevention of Intravascular Infections. Bureau of Communicable Disease Epidemiology, Laboratory Centre for Disease Control, Health and Welfare Canada

Ms. D. Phippen (cont'd)	- Member - Manitoba Advisory Committee on Infection Control - Infection Control Subcommittee
	- Community and Hospital Infection Control Association (C.H.I.C.A.) - Manitoba
	- St. Amant Centre - Infection Control Committee
Ms. P. Pugh	- President, MGEA, Local 66
Dr. L. Sekla	- Ad hoc Computer Committee - Manitoba Medical Association
	- Preventive, Environmental & Occupational Health, Manitoba Medical Association
	- Senior Health Official, Environmental Health Protection, Health and Welfare Canada
	- Member - Manitoba Advisory Committee on Infectious Diseases
Mr. Wm. Strukoff	- Director - Canadian Society of Laboratory Technologists.
Mr. R. Thompson	- Perinatal Screening Committee
	- Maternal Serum AFP Advisory Group
	- Maternal Serum AFP Working Group
Dr. T. Williams	- Member - Manitoba Advisory Committee on Infectious Diseases
Mr. L. Wilson	- Chairman - Committee of Radiological Managers of Manitoba.

CADHAM PROVINCIAL LABORATORY

WORKLOAD STATISTICS
1987-1988
With Comparison to 1986/87

SECTION	1986-1987 NO. OF SPECIMENS	1986-1987 NO. OF TESTS	1986-1987 STATISTICS CANADA UNITS	1987-1988 NO. OF SPECIMENS	1987-1988 NO. OF TESTS	1987-1988 STATISTICS CANADA UNITS
Clinical Microbiology	107,304	134,943	2,210,694	113,156	138,833	2,219,927
Media	-	-	353,544	-	-	331,366
Virus Detection	14,369	19,880	738,041	13,501	18,124	665,482
Environmental Microbiology	46,960	80,050	1,536,175	47,746	78,790	1,482,387
Serology/Parasitology	105,940	230,750*	3,571,530	100,905	242,759	3,801,444
Metabolic/Chemistry	60,678	210,934	1,155,353	59,742	214,096	1,150,635
CPL TOTAL	335,251	676,557	9,565,337	335,050	692,602	9,651,241

* These figures do not include R & D Serology. The 1987/88 figures do includes this activity.

CADHAM PROVINCIAL LABORATORY

ADMINISTRATIVE SERVICES SECTION

The Administrative Services Section provides support services to the CPL, to the rural lab & x-ray units and to the various health facilities and practitioners throughout the province. The section includes accounting, building management, clerical, data entry, receiving, mail, stores, and purchasing.

Decentralization of clerical staff during the last fiscal year was reviewed and the centralization concept was reinstituted. It was apparent that providing clerical assistance for staff absences and standardization of clerical procedures were too difficult to maintain in a decentralized system.

Data Entry staff enter an average of 14,000 requisitions and 15,000 results per month. Requistion data are entered for the Syphilis/Rubella program in Serology, and requisitions and results are entered for the Clinical Microbiology and Virus Detection programs.

In preparation for electronic messaging, a verification program was implemented in June, 1987. This program provides full text when coded entries are made and enables immediate correction of errors. This has dramatically reduced the number of reports sent out because of sender errors. The most common sender error is coding the wrong facility number, followed by using the wrong physician number.

The most frequent data entry error is selecting the wrong facility number when one is not provided, followed by using the wrong physician number.

A monitoring system has been implemented to provide direct feedback to lab users on both sender errors and on data entry errors.

The inventory of stock items shows 817 products with 909,292 items being counted. The inventory value of $303,048.67 showed a shortage of $86.61. An Inventory package has been acquired to run on an IBM P.C. This will be fully operational early in the new year.

Accounting activities include preparation and submission of all purchasing documents (requisitions, invoices, direct purchase orders etc.) plus verification of invoices to purchase orders for price and quantity variances. This section processes all customs clearances, travel and mileage claims, requisitions and invoices. The accounts receivable activities were changed at the beginning of the fiscal year, to invoice at the inter-provincial reciprocal rate for all non-insured lab services. AIDS testing has been included as a requirement for Visas and therefore is now being billed. Other invoicing being processed by this section includes recoveries for special studies and extraneous services such as communications and equipment and messaging charges.

In July, 1987 the first stage of our electronically-delivered laboratory reports was implemented. Completed reports are taken from the mainframe (Twin IBM3090's) to a System 36. Communications software (Access 36) formats the reports and sends them by long distance every night to our 73 remote terminals located throughout the Province. Turn-around times have been reduced by up to 9 days in rural and remote northern communities.

A program to test the feasibility of sending formatted Chemistry reports using Envoy 100 was implemented in September. This proved to be highly successful in reducing turn-around time; eliminating printing costs for unique Chemistry requisitions/reports, and providing flexibility in reporting normal values. All CPL Chemistry final reports are now sent electronically.

These messaging systems have, for the most part, functioned very well. We have, however, experienced some hardware problems with the Texas Instrument 707. A static build-up caused many of these machines to shut down during transmission of lengthy messages. Concerted efforts are now being made to upgrade the hardware to provide a better quality paper and to improve the systems.

CADHAM PROVINCIAL LABORATORY

CLINICAL MICROBIOLOGY

The Clinical Microbiology Section receives and processes clinical specimens. These specimens come from the offices of city and rural practitioners, from rural hospitals and nursing stations. Reference microbiology is performed on specimens received from all rural and city hospitals and some of these specimens are in turn referred to national or international laboratories.

Advances in Microbiology which are relevant to clinical specimens are assessed for their propensity to improve microbiological testing in either the Clinical Microbiology Section of the Cadham Provincial Laboratory or in rural laboratories. In the past year the Vitek system has been evaluated. This is a semi-automated system for speciation of bacteria and simultaneously testing for antibiotic sensitivity patterns. When originally submitted, the Vitek system had inadequacies in the software which were pointed out to the manufacturer. The software was revised and is now accurate enough to be incorporated into the routine laboratory although ongoing assessment and changes are necessary. Its introduction has allowed the Section to handle an increased specimen load without a need to increase staff.

In previous years a major part of the workload has been processing of specimens used in the diagnosis of sexually transmitted diseases. This year has been no exception. The number of specimens submitted for investigation of sexual abuse of children is also increasing and new strategies are being devised to detect infecting organisms in these types of cases. This investigative program is being carried out in co-operation with Dr. C. Ferguson in the Children's Hospital and Dr. R. C. Brunham at the Health Sciences Centre.

A small survey was conducted during the year to assess whether Y. enterocolitica infections were remaining undetected owing to not using a specific, selective medium for this pathogen. The study indicated that very few organisms were being missed. However, these were so few in number they should be sought with the special media only when the history of the patient indicated chronicity of the disease.

Newer tests were developed for detection of both Clostridium difficile toxin and verocytotoxins. The results of these tests may soon be available on the same day rather than the 24-72 hours now needed.

Antibiotic resistance patterns in the Province continue to be monitored. The more frequent isolation of Staphylococcus aureus resistant to methicillin (MRSA) is a cause for concern. Consequently, rural infection control practitioners have been warned to be on the look-out for these organisms and to take adequate preventive infection control steps when these organisms surface in their hospitals.

CADHAM PROVINCIAL LABORATORY
CLINICAL MICROBIOLOGY ISOLATES
1987/88
With Comparison to 1986/87

A. RESPIRATORY	NUMBER OF ISOLATES 1986/87	1987/88
C. diphtheria:		
gravis toxigenic	15	18
gravis non-toxigenic	5	5
mitis toxigenic	2	2
mitis non-toxigenic	27	42
B. pertussis	4	1
Acid Fast Bacilli		
positive culture	58	52
positive smears	10	23
Legionella:		
L. pneumophila	3	1

B. MYCOLOGY	NUMBER OF ISOLATES 1986/87	1987/88
Presumptive Tinea versicolor	13	20
Candida albicans	1052	788
Yeast, not C. albicans	200	80
Dermatophytes	58	84
Blastomyces dermatidis		3

C. STD	NUMBER OF ISOLATES 1986/87	1987/88
N. gonorrhoea	1583	1241
C. trachomatis	5401	5984
T. vaginalis	410	239
G. vaginalis	Test discontinued	6 (Ref.)

CLINICAL MICROBIOLOGY (continued)

D. MISCELLANEOUS	NUMBER OF ISOLATES 1986/87	1987/88
C. difficile non-toxigenic	284	49
C. difficile toxigenic	324	53
Streptococcus Group A	1180	773
Streptococcus Group B	940	503
N. meningitidis	28	10
L. monocytogenes	0	0
H. ducreyi	0	1
C. difficile cytotoxin	324	277

E. ENTERICS	ISOLATES 1986/87	NUMBER OF 1987/88
Escherichia Coli Group:		
08:K25	0	0
026:K60	26	23
055:K59	30	23
086a:K61	15	3
0111:K58	13	21
0119:K69	1	1
0125:K70	19	11
0126:K71	30	15
0127a:K63	3	5
0128:K67	29	31
0124:K72	1	0
018A018C:K77	1	3
0157:K7	3	23
075:Non-motile	1	0
Campylobacter fetus ss jejuni	160	147
Yersinia enterocolitica	19	31
Aeromonas hydrophila	199	218
Plesiomonas shigelloides	13	6
Shigella:		
S. boydii 1 sero II	0	1
S. flexneri 1	1	8
S. flexneri 2	20	9
S. flexneri 6	13	3
S. flexneri X	0	0
S. sonnei	42	15
S. dysenteriae sero 1	1	0
S. dysenteriae sero 2	4	0
S. dysenteriae sero 3		1

CLINICAL MICROBIOLOGY (continued)

E. ENTERICS (continued)	NUMBER OF ISOLATES 1986/87	1987/88
Salmonellae:		
S. arizona	1	0
S. Group B undifferentiated	0	4 (para B)
S. agona	7	13
S. brandenburg	1	1
S. heidelberg	15	50
S. minnesota	1	0
S. saint paul	13	2
S. schwarzengrund	1	11
S. typhi	4	0
S. typhimurium	125	63
S. senftenberg	3	0
S. infantis	12	13
S. montevideo	3	0
S. thompson	7	11
S. haardt	6	0
S. litchfield	2	1
S. muenchen	3	9
S. newport	13	6
S. enteriditis	16	67
S. havana	1	2
S. javiana	14	2
S. albany	1	0
S. nima	0	0
S. hadar	97	93
S. poona	2	0
S. panama	1	4
S. java	2	4
S. hvittingfoss	6	0
S. new brunswick	0	2
S. tennessee	1	0
S. madelia	2	0
S. manhattan	3	0
S. lomita	0	0
S. virchow	3	0
S. stanley	1	5
S. johannesburg	4	0
S. mbandaka	1	2
S. derby	2	2
S. untypable	1	2
S. bovis morbificans	38	34
S. species	11	22
S. paratyphi A		3
S. paratyphi B	1	4

CLINICAL MICROBIOLOGY (continued)

E. ENTERICS (continued)	NUMBER OF ISOLATES 1986/87	1987/88
Salmonellae: (continued)		
S. anatum	3	3
S. blockley	7	0
S. miami	1	2
S. ohio	2	14
S. typhimurium copenhagen	1	0
S. california		1
S. cerro		1
S. oranienburg		2
S. london		2
S. braenderup		1
S. weltevreden		4
S. rissen		1
S. nienstedten		3
S. berta		2
S. istanbul		1
S. othmarschen		2
S. uganda		1
S. reading		3
S. michigan		3

F. Percentages of Organisms Resistant to Antibiotics (Selected)

																					No. Tested
Acinetobacter anitratus			11		25		76	22	30		100	100	98	73	67						46
Acinetobacter lwoffi			1				16	9	17			75	76	39							74
Aeromonas hydrophila			0				95	9	7				75	20							193
Citrobacter diversus			0				100	0	8			0	0								15
Citrobacter freundii			7				45	26	16			8	70	62							56
Enterobacter aerogenes			0				100	10	0			36	95	78							20
Enterobacter agglomerans			0				81	0	25			60	75	59							32
Enterobacter cloacae			0			0	86	9	1			15	94	95							123
Escherichia coli			<1		0	0	46	24	18	0		1	21	<1							2,556
Klebsiella ozaenae			0				92	8	33			33	0								12
Klebsiella oxytoca			<1				97	8	8			6	32	0							145
Klebsiella pneumoniae			2				97	16	11			25	13	1							316
Morganella morganii			6				96	25	25			29	100	10							52
Moraxella sp.			4				11	4	0			0	4	0							28
Plesiomonas shigelloides			0				60		0				0								5
Proteus mirabilis			0				21	99	13	0		49	4	1							298
Proteus vulgaris			0				96	75	39			58	96	0							24
Pseudomonas aeruginosa		13	20		2	46				18					100	0					271
Pseudomonas cepacia		63	78		83	94			10	0					0	0					24
Salmonella enteritidis			0				18		0				0								40
Salmonella hadar			0				11	50	0			0	2								57
Salmonella typhimurium			0				5	0	0				0	0							39
Serratia marcescens			0				100	79	15			86	100	25							24
Shigella flexneri			0				43		71				14								7
Shigella sonnei			0				50		0				0								8
Yersinia enterocolitica			0				95		5				95								21
Staphylococcus aureus			5						<1				<1				<1	8	<1	90	0	1,822
Staphylococcus epidermidis			24						24				23				26	40	27	72	0	100
Staphylococcus saprophyticus			0						9				31				35	48	11	77		75
Streptococcus faecalis							2	73				2						45			25	648

CADHAM PROVINCIAL LABORATORY

VIRUS DETECTION SECTION

While diagnostic virus activities continue to rely heavily on conventional virus culture methods, activities in the Virus Section are increasingly focused on the introduction of new and rapid diagnostic viral techniques. Various respiratory syncytial virus Enzyme Immunoassay (EIA) methods have been evaluated and are now routinely used in the laboratory. Herpes simplex virus EIA diagnostic techniques have been evaluated. Rapid shell vial culture methods for the detection of cytomegalovirus to provide 72 hour service are now routinely in place. To facilitate the service component of rapid virus diagnosis, Mrs. H. Mawhinney has been promoted to the technical specialist level in this area.

Newly recognized important virus pathogens have been the focus of scientific and technical work. The human papillomavirus has received a great deal of attention within the laboratory, as Dr. Pat McNicol continues to develop and evaluate new methodology for the detection of this important family of human viruses. In addition, the recent recruitment of Dr. M. Dawood as a laboratory scientist will facilitate work on human retroviruses, especially AIDS viruses. He will evaluate new methodologies to improve the rapid detection and reference methodology of human retroviruses.

During the year, we have had a major community and institutional outbreak of gastroenteritis associated with small round enteric virus infections, the Norwalk-like viruses. Outbreaks have occurred in many hospitals and long term care institutions. Diagnostic methods for detection of these viruses require improvement. Ongoing collaborative studies are underway with CDC Atlanta.

The Virus Detection Section staff were involved in teaching the Clinical Virology Course 97:713 to 11 technologists and Infectious Diseases Fellows.

CADHAM PROVINCIAL LABORATORY
VIRUS ISOLATIONS
1987/88
with comparison to 1986/87

VIRUS ISOLATIONS	1986-1987 NO. OF DETECTIONS	1987-1988 NO. OF DETECTIONS
ADENOVIRUS		
Unconfirmed Adenovirus and Echovirus Type 22	1	
Unconfirmed Adenovirus and Unconfirmed Enterovirus	1	
Adenovirus - unconfirmed	26	
Adenovirus - untyped	38	8
Adenovirus 1	32	29
Adenovirus 2	26	24
Adenovirus 3	14	11
Adenovirus 4	0	
Adenovirus 5	9	8
Adenovirus 6	5	2
Adenovirus 7	4	3
COXSACKIE		
Coxsackie A17	0	
Coxsackie B2	0	
Coxsackie B3	0	
Coxsackie B4	0	
HERPES		
Varicella zoster	19	17
Cytomegalovirus	132	123
Herpes simplex	1,444	1,571
Herpes simplex 01	2	1
Herpes simplex 02	2	2
Herpesvirus (by E.M.)	21	18
Herpesvirus (by I.D. & F.A.)	-	1 (F.A.)
ECHOVIRUS		
Echovirus	2	
Echovirus 7	9	9
Echovirus 9	14	10
Echovirus 11	7	3
Echovirus 14	6	6

VIRUS ISOLATIONS (Cont'd)	1986-1987 NO. OF DETECTIONS	1987-1988 NO. OF DETECTIONS
ECHOVIRUS (cont'd)		
Echovirus 17	5	4
Echovirus 18	0	
Echovirus 21	3	4
Echovirus 22	5	6
CORONAVIRUS	14	9
INFLUENZA		
Influenza A	3	4
Influenza B	10	12
PARAINFLUENZA		
Parainfluenza 01	0	
Parainfluenza 02	1	1
Parainfluenza 03	11	13
POLIOVIRUS		
Poliovirus 01	24	4
Poliovirus 02	29	3
Poliovirus 03	17	3
Poliovirus not typed	1	
Poliovirus 1-2-3	2	1
ENTEROVIRUS Not typed	149	148
MOLLUSCUM CONTAGIOSUM	0	
POXVIRUS	1	1
MYXOVIRUS Not typed	2	1
ROTAVIRUS	227	214
RESPIRATORY SYNCYTIAL VIRUS	95	75
SMALL ROUND ENTERIC VIRUS	18	13
REOVIRUS		
Reovirus 01	1	
Reovirus 02	2	4
Reovirus 03	1	
Reovirus not typed	6	6

VIRUS ISOLATIONS (Cont'd)	1986-1987 NO. OF DETECTIONS	1987-1988 NO. OF DETECTIONS
MUMPS	1	1
PAPILLOMAVIRUS		
Papillomavirus 06	137	
Papillomavirus 11	140	
Papillomavirus 16	59	
Papillomavirus 18	59	

CADHAM PROVINCIAL LABORATORY

ENVIRONMENTAL MICROBIOLOGY SECTION

The Environmental Microbiology Section tests environmental samples (water, waste, food and air) to detect microbiological contamination.

I. Highlights

1. Water Analysis: Bacteria

a) A total of 591 water samples (see table section) were tested for Pseudomonas aeruginosa; 85 (14%) were positive. Thirty-four (34) were serotyped. A comparison of the serotypes identified in 1984, 1985, 1986, and 1987 indicates that in 1987 serotype 6 continued to be the most common isolate and serotype 3 was identified for the first time.

Serotype	1984	1985	1986	1987
1	0	1	2	1
2	2	0	1	0
3	0	0	0	4
4	2	12	8	2
5	2	0	0	4
6	0	6	17	11
7	0	0	1	0
8	0	0	0	0
9	4	2	2	1
10	7	2	3	6
11	9	6	2	3
16	0	0	3	1
Untypeable	0	0	18	1

b) A total of 84 samples of water/wastewater were tested for Salmonella and 13 were positive. Two positives (S. newport and S. enteritidis) were isolated from turtle tanks, seven positives were from Neepawa's sewage effluent and four were from Brandon's sewage sludge. On one occasion (Cell #2, 3' depth) two serotypes were identified in the same sample.

c) Tests for resistance to multiple antibiotics were done on 177 E. coli and three Aeromonas hydrophilia isolated from the Red River. Seventeen (17) exhibited resistance to three or more antibiotics. For the first time in recent years, the presence of an R factor was demonstrated in 20 isolates; the R factor transfer was as follows:

10 E. coli transferred R factor to a recipient E. coli

9 E. coli " " " Salmonella sp.

1 Aeromonas hydrophila transferred R factor to both recipients E. coli and Salmonella sp.

d) Seventy-four samples (mainly well water) were tested for iron bacteria; 52% (39) were positive.

e) Forty-six samples of water/swab/scrapings (see tables) were tested for Legionella spp and 16 were identified as L. pneumophila serotype 1 by culture and DFA. Counts ranged from 1.0×10^2 to 1.64×10^5 per litre. L. rubrilucens was isolated for the first time in Manitoba from the recovery room of a hospital (species typing done by National Reference Centre).

f) In collaboration with the Freshwater Fish Institute, a toxin negative Vibrio cholera Non 01 was isolated from water, sediment and snail samples obtained from a shallow pond used for fish farming. Vibrio parahaemolyticus was isolated from the pond water as well. Of interest is the observation that no faecal coliforms were detected in 100 mL of the pond water.

2. Water Analysis: Fungi

Eight requests for fungal counts were received. Venticillium lateritium was isolated from humidifier water. In samples of humidifier dust submitted by the City of Winnipeg Health Department counts of 34-200 CFU/g were reported.

3. Water Analysis: Giardia lamblia

Requests for the detection of this parasite in water continued to be received. Investigation of 20 samples failed to reveal any positives.

4. Wastewater Analysis: Viruses

Reoviruses 1 and 2 were isolated from four of six samples of sewage sludge tested.

5. Water Analysis: Projects

a) In collaboration with Agriculture Canada, the program of testing egg washes was continued. Of 120 samples tested, 19 (16%) had unacceptable counts, i.e. >100,000 SPC per mL.

b) In collaboration with the City of Winnipeg, the effectiveness of Roccal™, a dishwasher disinfectant, was investigated.

c) In collaboration with the Environmental Management Division, the study of recreational waters was continued during the summer of 1987. A total of 1,988 samples of lake water were tested. Of the 999 samples tested for faecal coliforms, 61 had faecal coliforms exceeding 200/100 mL, while 531 samples had more than 33 faecal Streptococci per 100 mL.

6. Food Analysis: Surveillance

a) Surveillance of milk shakes and soft ice cream machines.
In collaboration with the City of Winnipeg Health Inspection Services the monitoring was continued. Of 1,416 samples tested, 429 had unacceptable high bacterial counts. Failure to meet acceptable bacterial standards on two consecutive occasions resulted in the closure of 60 ice cream freezer machines.

b) Surveillance of food served on trains and planes.
In collaboration with Medical Services of Health and Welfare Canada this monitoring was continued. Of 95 samples tested, 39 (41%) had unacceptable bacterial counts (i.e. TC >100 organisms/g, EC >0 organisms/g, SPC >100,000 organisms/g), while 18 (10.7%) of 168 meals served on planes had unacceptable levels of coliforms (>100 organisms/g).

7. Food Analysis: Investigation of Food Outbreaks

A total of 214 food samples were tested; 75 had unacceptable indicator bacterial counts. Pathogens were identified in four outbreaks, detailed as follows:

i) C. perfringens was isolated from cooked ribs (having high total and faecal coliform counts). Two persons were reported ill in Winnipeg.

ii) S. aureus was isolated from a variety of foods obtained from one store supplying a hotel in Winnipeg; 38 persons were ill. Phage typing of food and clinical isolates revealed different patterns. In collaboration with the Medical Officers of Health, patrons of the hotel were investigated. Faecal examination revealed a Norwalk virus; the presence of this virus was confirmed by CDC. Of interest is the presence of E. coli in high bacterial and total coliform counts in the foods tested.

iii) S. aureus, B. cereus, and C. perfringens were isolated from the potato salad, turkey, and dressing consumed at a community kitchen fund-raising in Winnipeg, where 75 persons had food poisoning.

iv) S. aureus, B. cereus, E. coli and high SPC were found in egg salad and turkey samples submitted from Hodgson in the investigation of an outbreak where 50 persons reported food poisoning. Phage typing and enterotoxin detection revealed different patterns and toxin types in the egg salad and turkey. The turkey had an enterotoxin A and phage 29. Enterotoxin A and phage 29 were also found in a clinical (faecal) isolate.

8. Food: Research

In collaboration with the City of Winnipeg Health Department, a study was conducted on the effect of temperature on cream filling. Results confirm the recommendation that cream must be kept at 4°C not at room temperature.

9. R&D Section:

The following were investigated:

a) A method for the concentration of Cryptosporidium in water and identification by immunoassay.

b) Factors which may improve the use of all glass impingers for the detection of viruses in air, i.e. type of collection fluids.

c) Monoclonal antibodies were obtained from Dr. J. Joly of Laval University and used to type the L. pneumophila serogroup 1 isolates obtained from the water supply of a local hospital. Five different subtypes were differentiated, one of which appears to be responsible for several cases of nosocomial legionellosis reported from this hospital since 1985.

ENVIRONMENTAL MICROBIOLOGY
NUMBER OF SAMPLES TESTED
1987-1988
With Comparison to 1986-1987

	1986-1987	1987-1988
A. WATER - ROUTINE		
Membrane Filtration (MF)	35,190*	38,326
Most Probable Number (MPN)	4,191**	4,843
Standard Plate Counts (SPC)	21,965†	20,948
Total Water Tested	39,381	43,169
* Recreational water projects not included.		
**This figure is the number of samples received, two or more tests were done on each sample.		
† SPC is a second test done on treated samples tested for coliforms.		

B. FOOD		
Surveillance		
Food	424	417
Ice Cream	1,614	1,886
Outbreaks		
Food	256	214
Total	2,294	2,517

	1986-1987	1987-1988
C. WATER/SWABS/SCRAPINGS TESTED FOR LEGIONELLA:		
SOURCE/SAMPLE TYPE		
Hospitals	88	35
Swimming Pools/Whirlpools	2	0
Lakes	0	0
Water Trucks	0	0
Private Homes	6	1
Miscellaneous (Aquariums, humidifiers, cooling towers)	1	10
Total	97	46

D. WATER TESTED FOR PARASITES (GIARDIA):		
SOURCE/SAMPLE TYPE		
Lakes	3	0
Swimming Pools	1	0
Wells	3	11
Dugouts	1	1
Nursing Station	1	0
Sludge	2	0
Raw Water	0	3
Treated Water	0	5
Total	11	20

E. WATER TESTED FOR PSEUDOMONAS		
SOURCE/SAMPLE TYPE		
Swimming Pools	101	121
Whirlpools	386	419
Other	52	51
Total	539	591

DETAILS/RESULTS OF TESTS DONE ON WATER
1987-1988

1) MEMBRANE FILTRATION (MF) - ROUTINE TESTING

SAMPLE SOURCE/TYPE	TOTAL COLIFORM		FECAL COLIFORM	
	Total Number of Samples	Number Positive	Total Number of Samples	Number Positive
Raw	2,566	240	142	63
Municipal	19,401	354	1,554	21
Well	4,665	461	352	22
Lake	466	46	132	7
River	810	496	892	417
Ice	66	10	4	0
Swimming Pool	3,078	94	192	22
Water Mains	1,118	94	38	0
Miscellaneous (Pumphouse, standpipe, spring, cistern, dugouts, hydrants, reservoir, gravel pits)	1,530	325	1,320	112
TOTAL	33,700	2,120	4,626	664

11) MOST PROBABLE NUMBER (MPN) - ROUTINE TESTING

SAMPLE SOURCE/TYPE	TOTAL COLIFORM		FECAL COLIFORM	
	Total Number of Samples	Number Positive	Total Number of Samples	Number Positive
DRINKING:				
Tap	1,006	172	694	45
Well	291	116	182	37
Water Truck	115	28	87	7
Pumphouse	111	26	48	5
Standpipe	55	5	22	1
Bucket, Barrel	139	104	50	19
Lake	206	131	161	46
River	74	50	32	12
SUB-TOTAL	1,997	632	1,276	172
RECREATIONAL:				
Lake	162	35	125	8
River	171	59	132	20
Miscellaneous (Dugouts, Ditch, Pond, Creek)	169	59	116	29
Sewage	1,753	658	1,744	609
TOTAL	4,252	1,443	3,393	838

iii) PSEUDOMONAS AERUGINOSA (MPN) - ROUTINE TESTING

SOURCE/SAMPLE TYPE	TOTAL NUMBER TESTED	NUMBER POSITIVE
Swimming Pools	121	7
Whirlpools	419	68
Others	51	10
Total	591	85

iv) LEGIONELLA SPP.- ON REQUEST

SOURCE/SAMPLE TYPE	TOTAL NUMBER TESTED	NUMBER POSITIVE
Hospital Water	35	17
Swimming Pools/Whirlpools	0	0
Private homes, tap water	1	0
Cooling towers, humidifiers	10	0
Total	46	17

v) STUDY OF WADING POOLS (CITY OF WINNIPEG)

TEST PARAMETER	1986-1987		1987-1988	
	NUMBER TESTED	NUMBER POSITIVE	NUMBER TESTED	NUMBER POSITIVE
Total Coliform (MF)	302	12*1	331	18
Standard Plate Count	293	53*2	310	74

*1 >2/100 ml
*2 >10/1 ml

vi) RECREATIONAL WATER STUDY (MF)

	FECAL COLIFORM		FECAL STREPTOCOCCUS	
TOTAL NUMBER SAMPLES	NUMBER TESTED	NUMBER POSITIVE*	NUMBER TESTED	NUMBER POSITIVE*
1,998	999	61	999	531

* Fecal Coliform >200/100 ml
Fecal Streptococcus >33/100 ml

DETAILS/RESULTS OF TESTS DONE ON FOODS
1987-1988

i) ROUTINE TESTING

	TOTAL NUMBER TESTED	NUMBER POSITIVE
Surveillance: Food	417	166
Ice Cream	1,886	458
Outbreaks: Food	214	75
TOTAL	2,517	699

CADHAM PROVINCIAL LABORATORY

SEROLOGY/PARASITOLOGY

In the Serology Section of the Cadham Provincial Laboratory, specific antibodies or antigens are detected in blood samples submitted for the serodiagnosis of infectious or autoimmune diseases and for the assessment of the immune status of an individual.

In the Parasitology sub-section, parasites are identified in faeces, urine, blood or tissues.

A) HIGHLIGHTS

I. The Section has been actively involved in preparing for the computerization of records and reports.

II. AIDS

As in the previous year, this section provided a province-wide service for the serodiagnosis of human immunodeficiency virus (HIV). Protocol for testing consists of two steps; first, screening using two ELISA obtained from two different manufacturers and second, IFA, to confirm all borderline and positive ELISA results. From April to November 1987, Abbott and Ortho ELISA kits were used. In November, Ortho was replaced by Genetic Systems ELISA.

During this fiscal year, a total of 3,544 diagnostic sera were tested for anti HIV and 58 were positive. This represents a 286% increase in the number of specimens tested, compared to the previous year; yet the number of positives has decreased by 28%. The increase in testing is mainly due to requests from "non-high risk" groups as shown in Table 1, as "others". Table 2 summarizes the results of tests for anti HIV since the beginning of the program in December 1985.

During this period, 11 persons were classified in the "others" category, based on information available at the time of specimen collection. Follow up investigation revealed that one was probably a homosexual, one a bisexual, one had contact with a female in New York City, one was an intravenous drug user/prostitute who was visiting in Manitoba. Of the remaining seven, three were infected via blood transfusions prior to 1985, one male reported risk exposure in New York City, one male came from an endemic area in Africa, one female had a family contact with AIDS, and the final case is a female with no known risk factor and indeterminate serological status.

In addition to the serodiagnosis of AIDS, the Serology Section was involved in STAT testing of all organ donors; the Section participated in a number of serosurveys and evaluations of commercial kits.

TABLE 1

CADHAM PROVINCIAL LABORATORY

Serology - Diagnostic Anti HIV

April 1, 1987 - March 31, 1988

RISK FACTOR	NO. OF POSITIVE SERA/ NO. OF SERA TESTED
Homosexuals/Bisexuals	38/617
Intravenous Drug Users	0/301
Homosexuals/Bisexuals/ Intravenous Drug Users	4/31
Haemophiliacs	4/48
Global endemic exposure	3/41
Others	9/2506
Totals	58/3544 (1.6%)

TABLE 2

CADHAM PROVINCIAL LABORATORY

Serology - Diagnostic Anti HIV
December 1985-March 31, 1988

	RISK CATEGORY NO. POSITIVE/NO. TESTED						
YEAR	HOMOSEXUALS/ BISEXUALS	INTRAVENOUS DRUG USERS (IVDA)	HOMOSEXUALS/ BISEXUALS (IVDA)	HAEMO-PHILIACS	GLOBAL ENDEMIC AREA	OTHERS	TOTAL
December 1985	1/11	0/2	0/2	0/0	NA	0/9	1/24 (4.1%)
1986	61/451	0/51	2/12	6/22	NA	2*/245	71/781 (9%)
1987	40/648	0/237	4/26	4/48	3/27	7*/2088	58/3074 (1.8%)
January February 1988 March	6/109	0/88	0/8	0/9	0/14	2*/675	8/903 (0.88%)
TOTAL	108/1219	0/378	6/48	10/79	3/41	11/3017	138/4782 (2.8%)

III. Prenatal Screening for HBsAg

In June 1987 a one year pilot study was started. The aim of this screening program is to identify all pregnant women positive for HBsAg in order to offer their newborns prophylactic measures against Hepatitis B, i.e. HBIG and Heptavax. Early protection may prevent the development of hepatocellular carcinoma and liver cirrhosis later on in life.

From June 1987 till the end of March 1988, a total of 13,099 sera were tested and 81 (0.61%) were positive for HBsAg. Of the 81 positives, 36 were previously known to be carriers and 45 were newly identified.

IV. Interesting Findings

1. For the first time in years Yersiniosis was diagnosed serologically (by the National Reference Centre) in two persons:

   a) A 31 year old woman, who had excessive fatigue and a reactive arthropathy, had high titres of agglutinating antibodies to Yersinia enterocolitica serotype 0:3.

   b) A 16 year old woman, with swelling of the ankles due to Erythema nodosum, had a very high titre of agglutinating antibodies to the same serotype.

2. Another first for Manitoba was the diagnosis of Leptospira tarrassovi (made by the National Reference Centre) in a 57 year old male zoo attendant.

3. For the first time in Manitoba, a case of Lyme's Disease was confirmed by the National Reference Centre in a 63 year old woman from Dryden, Ontario who was hospitalized in Winnipeg. She had no history of tick bite or travel outside Canada. She had an atypical rash, no significant arthritis but had neurological symptoms. The CPL is now providing serodiagnostic services for Lyme's Disease.

4. Two interesting cases of Tularaemia were diagnosed serologically:

   a) A 51 year old female from rural Manitoba infected via a fish bone stuck in her hand.

   b) A 42 year old male from Ste. Anne who had a necrotizing lymphadenitis. This man had contact with wild animal hides.

5. A case of congenital syphilis was diagnosed this year. The mother, a 28 year old woman was treated for syphilis in 1987 but is reported to have been reinfected in Miami, Florida during this pregnancy.

6. A case of Parvovirus infection was confirmed by the National Reference Centre in a 7 year old girl with typical rash who had IgM antibodies to B19 parvovirus.

7. Two cases of Aspergillosis were confirmed by the National Reference Centre. One was a 55 year old man with a fungus ball who had precipitating antibodies to Aspergillus fumigatus; the other is a 38 year old woman with severe asthma who had precipitating antibodies to Aspergillus flexus and Aspergillus niger.

8. Seven cases of Arctic Trichinosis were confirmed by the National Reference Centre. Four of the seven had also antibodies to Echinococcus spp. tested at CPL.

V. During the fiscal year, the Section started providing, on request, tests for the determination of levels of whole IgG, IgA or IgM, as well as tests for C_3 and C_4.

VI. An attempt at analyzing the yield of the bacterial and auto-immune sections was initiated, consisting of a request for clinical information. A total of 362 such requests were sent to the senders and 58.8% responded; this exercise provided some useful information as follows:

1. Information on ASOT/ADB: The compliance in responding was 65%. The test was requested for the serodiagnosis of streptococcal complications in 96.2% of the replies. In 22.6%, the ASOT/ADB level was high, i.e. >200 IU/mL. This level of significance may be too high and should be reviewed. Alternatively, in a patient with compatible symptomatology but with low ASOT, a second blood should be requested routinely.

2. Information on microsomal and thyroglobulin antibodies: The compliance in responding was 75% and revealed that the request was related to the diagnosis of a thyroid disease in 96% of the cases. In those persons with compatible clinical picture, both tests were positive in 8.3%, both tests were negative in 45.8% and only the microsomal antibodies were elevated in another 45.8%. In the latter group, it would be useful to request a second blood routinely.

VII. The Section has responded to the need for more "STAT" serological testing by providing a 24 hours/7 day a week "call back" service for emergencies, i.e. organ donations, outbreaks in hospitals, etc. This strategy has required a rotation, involving all staff, now trained to provide a wide variety of tests likely to be needed on a STAT basis.

VIII. The Section has collaborated in a number of studies requiring serological testing for example:

1. Surveillance of nosocomial pneumonias at the HSC in collaboration with Infection Control staff at this institution.

2. In collaboration with the Red Cross and the National Reference Centre an investigation was conducted to detect the index cases responsible for the development of Chagas' disease in a recipient of his blood.

3. Three studies for the determination of antitoxin diphtheria and tetanus levels (i) one in collaboration with Alberta Health Department; (ii) in collaboration with Dr. Aoki a prevalence study comparing levels in geriatric population with those in blood donors (Table ST7); (iii) in collaboration with Infectious Diseases fellows in Kenya, studying the immune status of women at time of delivery.

4. The Section participated in a study of Norwalk virus infection in two outbreaks of gastroenteritis in Winnipeg during the winter of 1987.

IX. Parasitology

A Ph.D. student continued her work on Cryptosporidium characterization of isolates using SDS PAGE and Western Blotting.

X. Serology Research and Development

1. A listing of the R&D performed in 1987-1988 is as follows:

A. AIDS Testing

1) Screen tests

5 ELISA screen tests evaluated:
- Genetic Systems LAV EIA
- Ortho HTLV-III ELISA Test System
- DuPont HTLV-III ELISA
- Wellcozyme Anti HTLV-III
- Abbott HTLV-III ELISA

2) Confirmatory Tests

a. Biotech/Dupont HIV Western Blot
b. Microgene Sys - MG Search HIV 160
c. Envacor HIV EIA (Abbott)
d. IFA-IAF (Institut Armand Frappier) vs. HUT (CPL)
e. HIV Antigen Detection (Abbott)

B. Mycoplasma pneumonia IgM Detection

Serodia. Mycoll (particle agglutination) vs. IFA-IgM (CPL)

C. Lyme Disease

IFA antibody detection

D. Legionella pneumophila

ELISA for detection of IgG, IgM antibody to serogroup 1.

E. Infectious mononucleosis

Evaluation of 8 rapid slide tests vs. EBV-IgM (IFA).

F. Western Equine Encephalitis Surveillance

2. A summary of the R&D results is presented as follows:

A. AIDS Testing

1) Five ELISA screen tests to detect antibody to HIV-1 were evaluated using sera confirmed as positive or negative by LCDC (Ottawa). A total of 153 positive and 115 negative sera were tested. Four of the manufacturers use disrupted virions (HIV-1, Gallo) cultured in H9 cells while Genetic Systems EIA uses LAV virus grown in CEM cells. The sandwich technique is used for all except Wellcozyme Anti HIV-III which is a competitive binding assay. Results using LCDC as gold standard are as follows:

		Abbott	Ortho	Dupont	Wellcome	System
n = 153	Sensitivity	99.4% (1)*	100% (0)	100% (0)	98.7% (2)	100% (0)
n = 115	Specificity	91.3% (12)†	97.5% (3)	100% (0)	92.7% (9)	95% (6)

* = (No. false negatives)
† = (No. false positives)

a) A Western Blot (Biotech/DuPont HIV) for detection and identification of antibodies to HIV was evaluated as an additional confirmatory test to be used in so called "problem sera", i.e. those showing a discrepancy in the screen tests or in instances where the IFA test was difficult to interpret. Visualization of the various immunoglobulins bound to the various viral proteins is by a biotin-avidin ELISA system.

A total of 151 sera were tested. i) in 146 which were positive by 2 ELISA screen procedures and by IFA, the Western Blot was positive in 142

(97.3%) and indeterminate in 4 (2.7%) using the manufacturers criteria of presence of both p_{31}, p_{24} and one of gp 41, 120, 160. In the four that were indeterminate, three showed no p_{24} bands and one had no pg41, 120 or 160;
ii) in five sera in which the ELISA screen tests were positive but the IFA was weakly reactive, the Western Blot was negative in two and indeterminate in three. Of the three that were indeterminate, two had no p_{24} bands and one had no gp41, 120, 160 bands.

b) MicroGeneSys - MG Search HIV 160

A screen test to detect antibody to HIV-1 using a recombinant gp 160 protein produced in insect cells was evaluated on a total of 147 sera. One hundred twenty-eight of these were positive by at least two ELISA screen tests and IFA. Of these, 127 were also positive by the gp160 test. The one discrepancy was in a serum that had no glycoproteins present in the Western Blot. Also 14 sera that were negative by the screen tests were tested and all 14 were found to be negative by the gp160 test. In five sera which were positive by the ELISA screen tests but weakly reactive by IFA, four were negative by the gp160 test. Reproducibility on 15 samples, within run and between runs, was 100%. The HIV-160 is highly specific (100% and sensitive (99.2%) and would be useful as a screen test; however, technically it is more demanding than the ELISA tests requiring 48 hours to complete.

c) Envacor HIV EIA (Abbott) is a competitive binding ELISA confirmatory test consisting of two separate detection systems directed against the two major groups of HIV-1 proteins, envelope and core. A recombinant derived DNA HIV-1 antigen is used for both p_{24} and gp41.

This test was evaluated on 53 sera that were positive by two screen tests, gp 160, IFA and Western Blot. Fifty-three (100%) were positive using the recombinant gp41 antigen however only 31 (58.5%) of these sera were positive to the p_{24} component, two gave borderline results. Of the 20 that were negative to p_{24}, six sera had strong p_{24} bands on the Western Blot, 10 sera had weak p_{24} bands, and in two the p_{24} bands were absent. In two sera the Western Blot could not be done.

There was a 100% correlation between MicroGen Sys HIV and the Envacor HIV gp41 component.

d) An IFA test using uninfected and HIV infected malignant T cells (HUT) obtained from Dr. M. O'Shaughnessy, LCDC, and cultured at the CPL was compared to a commercially available, approved test that uses H9 cells (IAF). A total of 20 coded sera were tested by both methods. Of 14 sera that were positive by two ELISA screen tests and Western Blot all 14 were positive by both methods, however, five sera showed non-specific fluorescence in the uninfected HUT cells. As a result only 9 (65%) of the sera would have been considered positive. Of six sera considered to be "problems" as the screen tests were not conclusive, all six were Western Blot negative. Of these, three were negative and three were weakly reactive by IAF, whereas on the HUT cells two were negative, two were weakly reactive and two were positive. The two weakly reactives and the two positives had non-specific fluorescence in the uninfected cells.

Non-specific fluorescence seems to occur more frequently with the HUT cells in comparison to the H9 (IAF). This may be due to the conjugate used, although similar results were obtained with two different lots. Further investigation is needed.

e) An in vitro solid phase ELISA (Abbott) to detect HIV antigens in human sera was tested on a total of 106 sera. Of 45 sera from symptomatic patients who were serologically positive by the screen and confirmatory tests, 8 (18%) were positive for HIV-1 antigen and 3 (6%) were borderline. In 30 sera from asymptomatic but serologically positive patients, 3 (10%) were positive for HIV antigen, and 1 (3%) was borderline. In 31 patients who had symptoms but who were HIV antibody negative no HIV-1 antigen was detected.

In this series none of the high risk symptomatic patients that were antibody negative were HIV antigen positive, despite the fact that antigen detection usually precedes seroconversion. This may be due to the lack of sensitivity (estimated to be around 40%) of this test.

B. <u>Mycoplasma pneumonia IgM Detection</u>

As the IFA antigen routinely used in the CPL was discontinued by the manufacturer (Wellcome) different

commercial antigens were evaluated for use in the IFA-IgM test. The most suitable was Behring's CF antigen, however there was some difficulty in reading the test. An alternative method was needed. Of interest was a new test from Japan, Serodia:Myco 11 It is a microtiter particle agglutination test which uses stained gelatin particles as carriers of the antigen (cell membrane components of Mycoplasma pneumonia, MAC strain). According to the manufacturer it exclusively detects IgM. One kit of 25 tests was evaluated. A comparison was made with the IFA-IgM procedure currently in use. To determine if the test truly detected only IgM, three positive sera with IFA-IgM titers of >1:40 were quantitated by the agglutination test, then the IgG and IgM separated by Sephadex column and each fraction tested separately. Titers before separation on the three sera were 1:640, 1:160: 1:320. After fractionation no IgG was detected at a dilution of 1:20; and the IgM fraction titers were 1:640, 1:160, 1:320, an indication that the Serodia:Myco 11 specifically detects IgM. No cross reactivity was found when CMV-IgM (5), HBsAg (5), HAV-IgM (5), RF (5) positive sera were tested. Twenty-six sera that were IFA $\leq$1:10 to IgM had titers of less than 1:20 by Serodia:Myco 11. Of six IFA IgM positive sera, i.e. $\geq$1:40, all had titers >1:80 by Serodia:Myco 11.

The initial study indicates that this may be a simple, specific test that can be used to serologically diagnose Mycoplasma pneumoniae infections. However further studies must be done as no information as to the sensitivity or specificity of the test is given by the manufacturer.

C. Lyme Disease

An IFA assay to detect antibody to Lyme Disease (Borrelia burgdorferi) was set up using a killed antigen (strain B31) obtained from LCDC, Ottawa. To date sera from 11 patients have been tested with one positive (titer of 1:512). This patient was initially diagnosed by LCDC, Ottawa.

D. Legionella pneumophilia Serogroup 1 ELISA detection of IgG and IgM.

1. A sandwich ELISA test was developed that could be used to detect either IgG or IgM. The Philadelphia strain was used for antigen preparations. Three types of antigens were tested: whole organism, sonicated and soluble. The soluble antigen was found to be the most suitable for detection of both IgM and IgG. Optimal serum dilutions were 1 in 200 for IgG, 1:40 for IgM. The test was adapted so that Behring's reagents and

processor could be used. The variance in coating of wells was minimal, reproducibility from run to run was excellent. Coated plates could be stored for at least one month. The sensitivity and specificity for the IgG determinations was 100% and 56% using the IFA (at a initial dilution of 1:64) as the reference standard. Twenty sera that were <1:64 by IFA were quantitated by IFA starting at 1:4. Most had low levels of antibody ranging from 1:4 to 1:32. Only two were found to have titers less than 1:4. Of the 20, four sera were negative by the ELISA procedure. The specificity and sensitivity for the IgM determination using the IFA (titer of ≥1:40) was 97% and 93%.

2. Nosocomial Study, HSC

Sera were received from 112 patients with hospital acquired lower respiratory tract infections, 43 with only an acute-phase sample and 69 with paired samples. All were tested by both IFA and ELISA for IgG and IgM. On the 43 acute-phase sera, IgG was detected in four patients by IFA (9.3%) (≥1:64) and in 18 (41.8%) by ELISA (1:200). No IgM was detected either by IFA (≥1:40) or ELISA (1:40). There were three borderline positives by IFA and four by ELISA. Of the 69 patients with paired samples, 11 (15.9%) were positive for IgG by IFA, and 35 (50.7%) by ELISA. There were four patients that were IgM positive (≥1:40) by IFA and seven by the ELISA test. Two patients demonstrated seroconversion by both methods.

E. Infectious Mononucleosis

At the request of LAXUS, eight rapid slide tests were evaluated using three groups of sera: 1) EBV-IgM Positive, Cellognost* Positive; 2) EBV-IgM negative, Cellognost negative; 3) EBV-IgM Positive Cellognost negative.

In addition, two heterophile positive sera were quantitated by all eight tests for sensitivity.

Five of the slide tests use treated horse erythrocytes; two use latex particles coated with purified bovine heterophile antigen, one test used dried horse/sheep erythrocytes and guinea pig antigen.

With the eight slide tests the sensitivity and specificity was 100% on groups 1 and 2 sera. The specificity of the tests using horse RBC was poor in the group 3 sera (58%), the latex agglutination test correlated

* Behring

slightly better (63%), but lacked specificity as 2/10 sera reacted with HBsAg positives, 4/10 reacted with Hepatitis A IgM positive sera; although no cross reactivity was detected by both latex and those using horse RBC on sera positive for RF, Syphilis, Rubella IgM, Measles IgM.

As there were only minor differences in sensitivity and specificity between the tests utilizing horse erythrocytes, the Ortho IM screen test was selected mainly on the basis of equal performance to the other tests, ease of testing and reading, and lower cost/test.

Improvements recommended by CPL to the manufacturer such as replacement of wooden applicator sticks with plastic paddles, and use of a more rigid card, was followed and included in subsequent kits.

F. Western Equine Surveillance 1987

This year the program was conducted in conjunction with Dr. Roy Ellis, and with the technical assistance of a STEP student. It was limited to the testing of sentinel chicken flocks located only in the Winnipeg Area (five areas, 10 chickens in each). Samples were collected every two weeks from June to September and tested by the hemagglutination-inhibition (HAI) method. A total of 367 chicken sera were tested. Of these, two seroconversions occurred on August 18th from a location in Transcona. There was minimal Western Equine Encephalititis activity in the Winnipeg area in 1987.

In addition, bloods from seven horses were tested. One horse was positive demonstrating a seroconversion from 10/320 by HAI. As well, 18 humans with symptoms compatible to WEE were tested. All were negative.

B) STATISTICAL REPORT

The following tables summarize the workload during this fiscal year and whenever possible provide a comparison with previous years.

SEROLOGY/PARASITOLOGY OVERALL STATISTICS
1987-1988

	1986-1987			1987-1988		
	NUMBER OF SPECIMENS	NUMBER OF TESTS	NUMBER OF UNITS	NUMBER OF SPECIMENS	NUMBER OF TESTS	NUMBER OF UNITS
SEROLOGY	94,977	219,771	2,969,573	90,554	224,458	3,155,391
R&D SEROLOGY	-	4,707	107,902	-	7,219	149,003
PARASITOLOGY	10,963	10,979	494,055	11,002	11,082	497,050
TOTAL	105,940	235,457	3,571,530	101,556	242,759	3,801,444

SYPHILIS SEROLOGY

	1985-1986		1986-1987		1987-1988	
	Number of Specimens	Number Reactive	Number of Specimens	Number Reactive	Number of Specimens	Number Reactive
Blood	54,678	892	55,267	740	50,285	505
CSF	356	4	440	3	313	-
IFA	51	5	42	3	42	-

	1984-1985	1985-1986	1986-1987	1987-1988
No. Persons Reactive with Previous History	814	748	645	434
New Cases	86	69	43	7
New Cases in Registry	61	75	58	64

BACTERIAL AND MISCELLANEOUS SEROLOGY

	Positive Level	1986-1987 Number Tested	1986-1987 Number Positive	1986-1987 Positive Percent	1987-1988 Number Tested	1987-1988 Number Positive	1987-1988 Positive Percent
Widal	1:50	87	9	10.3	42	4	9.5
Brucella abortus	≥1:160	404	9	2.2	186	13	7.0
Pasteurella tularensis	≥1:80	38	5	13.2	21	4	19.0
CRP	>5 mg/l	257	41	16.0	103	34	33.0
Rheumatoid factor	>1:24	3,050	150	4.9	2,105	124	5.9
Thyroglobulin antibody*	>1:160	602	38	6.3	369	37	10.0
Microsomal antibody*	>1:1600	602	105	17.4	369	67	18.2
Antinuclear factor	≥1:160	1,197	64	5.3	1,156	63	5.5
Antimitochondrial	≥1:40	23	4	17.4	54	4	7.4
Anti Smooth Muscle	≥1:40	5	0	-	35	4	11.4
Anti-DNA	≥1:20	NA	NA	NA	146	5	3.4
Anti-Parietal	≥1:20	NA	NA	NA	3	1	33.3

*Both tests marked with * must be elevated to be considered an autoimmune thyroid disease.

RUBELLA SEROLOGY

A. Number of Rubella Tests

	1986-1987	1987-1988
PHA Screening	29,027	28,728
IgM	666	691

B. Details of Prenatal Surveillance

	1986-1987			1987-1988		
Test	Number Tested	Susceptible	Percent	Number Tested	Susceptible	Percent
PHA	14,251	347	2.4	15,231	401	2.6

C. Details of Rubella Diagnostic Testing

	1986-1987			1987-1988		
Test	Number Tested	Number with IgM Present	Percent	Number Tested	Number with IgM Present	Percent
IgM	666	3	0.5	691	9	1.3

IMMUNE STATUS SEROLOGY

	1986-1987		1987-1988	
	Number Tested	Percent Susceptible %	Number Tested	Percent Susceptible %
Measles	154	9.7	107	13.1
Mumps	93	17.2	71	16.9
Diphtheria	469	43.7	171	13.5
Tetanus	471	33.8	172	10.5
Pertussis	199	6.0	84	6.0
Varicella/ Zoster	1,503	6.1	2,096	4.8

HEPATITIS SEROLOGY

	1986-1987			1987-1988		
	Number Tested	Number Positive	Percent Positive	Number Tested	Number Positive	Percent Positive
HBsAg*	11,733	463	3.9	8,949	535	6.0
Anti HBs	1,269	574	45.2	1,386	717	51.7
Anti HBc	396	88	22.2	311	68	21.8
HBeAg	268	118	44.0	282	107	38.0
Anti HBe	271	107	39.5	282	136	48.2
HAV IgG/IgM	58	27	47.0	37	21	56.8
HAV IgM	2,709	158	5.8	2,641	122	4.6
Anti HBcIgM	31	9	29.0	134	13	10.3
Anti Delta	41	1	2.4	16	-	-

*HBsAg diagnostic tests, i.e. excluding screening of prenatal sera which were included in previous years.

RESPIRATORY SEROLOGY

A. Tests Done on Single Bloods	1986-1987		1987-1988	
	Number Tested	Number Positive	Number Tested	Number Positive
ASOT	2,063	435	1,618	309
ADB	156	19	179	24
Cold Agglutinins	515	44	226	11
Infectious mononucleosis (spot test)	2,377	63	2,985	52

B. Tests Done on Paired Bloods

	1986-1987					1987-1988				
	Number Tested	Seroconversion	Significant Change in Ab	High Static	Presence IgM	Number Tested	Seroconversion	Significant Change in Ab	High Static	Presence IgM
Mycoplasma pneumonia	2,973	28	18	37	313	2,199	4	4	21	72
Legionella spp.	741	1	1	19	9	1,241	3	-	2	10
Chlamydia spp.	221	1	1	8	10	265	-	-	-	3
Q Fever	216	1	-	-	-	109	-	-	-	-

B. Tests Done on Paired Blood (cont'd)

	1986-1987				1987-1988			
	Number Tested	Seroconversion	Significant Change in Ab	High Static	Number Tested	Seroconversion	Significant Change in Ab	High Static
Adenovirus	1,566	4	2	12	1,217	3	-	12
RSV	1,461	4	-	4	1,103	2	-	4
Parainfluenza 1	1,437	3	1	2	968	-	1	-
Parainfluenza 2	1,437	6	-	-	969	-	-	-
Parainfluenza 3	1,447	4	1	6	969	-	-	-
Influenza A	1,713	24	9	20	1,228	14	-	12
Influenza B	1,683	13	1	20	1,061	34	-	1

HERPES SEROLOGY

	1986-1987				1987-1988			
	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive
Herpes simplex	1,502	4	15	66	1,930	2	-	115
Herpes zoster	1,120	3	1	31	764	-	-	49
Cytomegalovirus	1,616	3	6	36	2,149	-	1	94
Epstein-Barr IgM	1,663	NA	NA	134	2,962	NA	NA	148

MISCELLANEOUS VIRUS SEROLOGY

	1986-1987				1987-1988			
	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive	Number Tested	Sero-conversions	Significant Change in Ab	Number IgM Positive
Measles	2,506	-	140	147	997	-	-	24
Mumps	650	1	4	12	565	-	-	17

	1986-1987			1987-1988		
	Number Tested	Sero-conversion	High Static Titre	Number Tested	Sero-conversion	High Static Titre
RMSF	20	-	-	13	-	-
Rotavirus	295	7	6	176	1	-

TOXOPLASMA DIAGNOSTIC

1985-1986			1986-1987			1987-1988		
Number Tested	Number Positive	Number Prenatal Positive	Number Tested	Number Positive	Number Prenatal Positive	Number Tested	Number Positive	Number Prenatal Positive
82	6	0	949	10	0	817	1	0

MISCELLANEOUS REFERRED-OUT SPECIMENS
1987-1988

	NUMBER SPECIMENS REFERRED OUT	NUMBER POSITIVE
Parvovirus	6	1
Rabies	114	NA
Yersinia sp.	7	3
Leptospira sp.	15	1
Gonococcus Complement Fixation Test	7	-
Aspergillus	43	4
Histoplasmosis	36	-
Blastomycosis	17	-
Coccidioidomycosis	29	-
Cryptococcus	3	-
Candida	15	-
Coccidio Paracoccidioides brasiliens	1	1
Paragonomiasis	1	1
Amoebiasis	-	-
Hydatid Disease	-	-
Trichinosis	33	11
Visceral Larva migrans	27	-
Filariasis	15	-
Malaria	5	1
Schistosomiasis	12	-
Leishmania	3	-
Trypanosoma	4	-

PARASITOLOGY YEAR END REPORT
1986-1987 versus 1987-1988

	1986-1987	1987-1988
Total Number of Specimens Examined	10,893	11,002
A. PROTOZOA: PATHOGENIC		
Blastocystis hominis	420	462
Cryptosporidium sp.	113	70
Dientamoeba fragilis	22	52
Entamoeba histolytica	83	79
Giardia lamblia	377	282
Plasmodium vivax	34	15
PROTOZOA: NON-PATHOGENIC		
Chilomastix mesnili	13	20
Entamoeba coli	301	361
Entamoeba hartmanni	42	35
Endolimax nana	195	213
Iodameoba butschlii	6	13
Trichomonas hominis	0	1
B. TREMATODES		
Clonorchis	7	36
Schistosoma hematobium	0	1
C. CESTODES		
Diphyllibothrium latum - ova	16	26
- adults	1	10
Hymenolepis nana	1	17
Taenia sp. - ova	5	13
Taenia saginata - adults	2	1

PARASITOLOGY YEAR END REPORT
1986-1987 versus 1987-1988

	1986-1987	1987-1988
D. NEMATODES:		
Ascaris lumbricoides - ova	17	20
- adults	10	14
Enterobius vermicularis - ova	10	28
- adults	3	8
Strongyloides stercoralis	11	15
Hookworm sp.	32	45
Trichostrongylus ps.	0	1
Trichuris trichiura	27	31
E. ARTHROPODS		
Phthirus pubis	6	3
Pediculus humanis	1	2
Nits	3	0
Dermatobium sp. larvae	1	1
Cimex sp.	1	1
Dermanyssus sp. mite	0	1
Sarcoptes scabiei mite	0	1
Trombicula sp. mite	0	1
F. SEROLOGY		
Amoebiasis	38 patients	39
	1 positive	2
Hydatid	32 patients	49
	2 positive	7
G. PERMANENT SMEARS EXAMINED		
Kinyoun Acid-Fast	2,899	3,190
Trichromes	2,835	3,172

CADHAM PROVINCIAL LABORATORY

TECHNICAL SUPPORT SERVICES

Quality Control

Activities in this section have continued as in previous years with certain modifications and improvements noted herein.

Since a major undertaking of this section is the provision of proficiency specimens, we maintain over 300 viable strains of bacteria, fungi and yeast by various means and conditions. These organisms have been obtained both from isolates in clinical specimens at CPL and the Laboratory Centre for Disease Control (LCDC) and American Type Culture Collection (ATCC) purchased strains.

Clinical and Environmental Microbiology, Serology and Virus Detection regularly receive "blind" internal proficiency specimens prepared in this section to mimic a clinical specimen. The technologists in QC have provided skin and buccal scrapings, blood urine, sputum, hair and food to authenticate these specimens. The pathogens, of course, come from our stock cultures.

Microbiology laboratories in LAXUS also receive specimens on a regular basis but they are aware that these are proficiency specimens. These specimens help to ensure that interpretation and sensitivity testing remains consistent throughout LAXUS and they identify areas of concern that can be addressed either by followup specimens or continuing education.

Other programs in LAXUS include slides for Gram stain and interpretation; detection of Beta Streptococcus Group A by rapid testing; urine for pregnancy testing and serum for infectious mononucleosis testing.

Pretesting of new lab lots of reagents; pretesting of kits such as those for pregnancy and infectious mononucleosis, antimicrobial discs, urine dip slides, etc. has continued and will be better coordinated by the move of the Portage stores to Winnipeg. Determining when and/or why products become faulty is an important link that has so far been elusive.

Extensive evaluation has occurred in two areas; heart infusion agar for blood agar and Amies transport media with charcoal. In one instance, this resulted in remaining with the original source (Gibco heart infusion agar) and in the other we switched to another supplier, Starplex.

External proficiency testing programs such as College of American Pathologists (CAP) are coordinated in QC. We distribute the specimens to the appropriate sections; request results by a given deadline and

store and stock all specimens until the comprehensive results are returned.

Media Preparation

This section continues to provide a large number of routine and highly specialized media for CPL, LAXUS and special agreement units including Mount Carmel Clinic.

A new chemical fume hood and acid storage cabinet were recently installed. Since many noxious and potentially carcinogenic chemicals are used in this section, these installations will provide a safer work environment.

A number of additional media and reagents have been added to our catalogue, including specialized media for water testing, probe technology and Hemophilus ducreyi.

The following media and reagents have been prepared and tested:

1. Calcofluor white stain for fungi - a fluorescent stain for highlighting the morphology of fungi. This stain has been incorporated into the routine in mycology.

2. Inhibitory Mold Agar - tested and replaced Mycobiotic agar in routine mycobacteria culture.

3. SABHI - tested and replaced Sabourauds Agar in routine mycobacteria culture.

4. Zyme B Reagent - for use with API rapid Strep. test.

5. LB Medium - prepared for use in DNA probe technology.

6. Mannitol Salt Agar - a selective media for detecting Staphylococcus aureus in stool of food poisoning victims. This agar is being evaluated by the Microbiology Section for consideration of inclusion into the routine.

7. m Endo LES Agar - a selective agar for determining coliform contents in water samples. This media is now being prepared routinely for routine water testing and replaces ENDO Broth which was purchased commercially prepared.

8. Sulfuric Acid - Methylene Blue Reagent - a selective stain for Nocardia species that is now used routinely.

9. Modified Hanks Acid Fast Stain - an acid fast stain for identification of Nocardia species. This stain is used in mycology.

10. Lysozyme Broth - used for identification of Nocardia species. This media is used routinely in the Microbiology Section.

11. Modified Kellys' Medium - for isolation of spirochetes. This media is used in research for the study of Lyme disease.

12. BHI and Glycerol - used for storage and shipment of Neisseria gonorrhoeae strains.

13. HCl-KCl Buffer - used for isolation of Legionella spp. from environmental water samples.

14. 10% Sodium deoxycholate - used for identification of Streptococcus pneumoniae. This medium is now used routinely to test bile solubility.

15. Todd Hewitt Broth with 1% Dextrose - used for a special project in environmental microbiology.

16. Potassium Nitrate Assimilation Agar - used in identification of yeast and presently used routinely.

17. Agarose B - used for counter immunoelectrophoresis in Virus Detection.

18. Hemophilus ducreyi media - this selective media is prepared fresh weekly for any routine requests that may come along.

Sterilization

This section is responsible for effective and efficient decontamination of all biohazardous materials at CPL. Therefore, the safety of staff and the environment rely heavily on a correct protocol.

Other very important functions include the provision of scrupulously clean glassware, free of any chemical impurities, and the sterilization of materials.

CADHAM PROVINCIAL LABORATORY

METABOLIC DISEASES AND DIAGNOSTIC/PUBLIC HEALTH CHEMISTRY

Metabolic Diseases Section

Last year our Metabolic Diseases Section screened 17,482 newborn blood specimens (100% compliance) and 13,736 urine specimens (78.5% compliance). Retests were done on 753 bloods and 1,098 urines; out of these, 150 were referred to the Metabolic Consultant and 190 bloods and 126 urines were investigated for possible abnormalities. The rest of the repeats were requested due to inadequate specimen collection (e.g. insufficient quantity, contamination, etc.).

We found seven cases of confirmed inborn errors of metabolism: 1 D/G galactosemia variant, 1 phenylketonuria, 1 tyrosinemia, 1 hypothyroid (iodine trapping deficiency), 1 Hartnup Disease, 1 cystinuria, and 1 histidinemia.

We instituted an improved method in our galactose screen. Neonatal specimens exhibiting increased levels of galactose and/or galactose-1-phosphate are followed with an analysis for the enzyme galactose-1-phosphate uridyl transferase to rule out or confirm classical galactosemia. In those filter paper blood specimens that are delayed in transport and stored under adverse conditions prior to delivery, the enzyme may become inactivated leading to a false positive result (absence of activity is indicative of classical galactosemia). Addition of a thiol protective reagent to the testing procedure reactivates the enzyme for analysis and has greatly reduced the number of patient specimens that must be recollected for analysis.

A pilot study performed in the Metabolic Diseases Section has demonstrated that measurement of 17-alpha-hydroxyprogesterone in neonatal filter paper blood specimens can be utilized for the early diagnosis of Congenital Adrenal Hyperplasia (CAH).

Congenital Adrenal Hyperplasia is an autosomal recessive inherited disease resulting in defective function of adrenal steroid biosynthesis. Affected homozygotes present varying degrees of glucocorticoid and mineralocorticoid insufficiency plus prenatal and postnatal virilization. CAH can be suspected in three clinical situations: the female neonate with ambiguous genitalia; the neonate with evidence of acute adrenocortical insufficiency; or the older child with progressive virilization. Therapy with replacement doses of cortisol and mineralocorticoid is life-saving and permits normal growth and sexual maturation.

CAH occurs in Manitoba approximately once in every 14,500 live births resulting in an incidence that is more frequent than that of PKU and slightly less than that of primary hypothyroidism.

A procedure is under development for the quantitative fluorescent analysis of phenylalanine, galactose, and galactose-1-phosphate in neonatal blood specimens. Improved assay sensitivity, linearity and precision is expected with the modified procedure, in addition to a reduction in cost of consumable materials currently used.

Chemistry Section

In our Chemistry Section, changes were made in the serum TSH procedure. The double antibody sequential saturation assay for thyrotropin has been replaced by a monoclonal antibody immunoradiometric assay. The new procedure offers increased low concentration sensitivity, extended linear range, and improved assay precision. These improvements allow better discrimination of thyroid function status.

New cholesterol (lipid profile) guidelines and protocol were also the result of last year's changes. The awareness is growing that reduction of elevated blood cholesterol levels is important for the prevention of coronary heart disease. The need for reliable lipid measurements in the laboratory is more important than ever and will remain so in light of the rapidly increasing demand for cholesterol testing. The Chemistry Section of the Cadham Provincial Laboratory has been working toward meeting the recommendations of the Laboratory Standardization Panel from the National Cholesterol Education Program. These goals include:

1. Adopting a uniform method of reporting cholesterol values relating to risk of coronary heart disease using the cutpoints issued by the National Cholesterol Education Program Adult Treatment Panel in October 1987.

2. Initially achieving an overall precision consistent with a CV of 5% or less; and ultimately achieving a CV of 3% or less.

3. Reducing existing methodological biases to less than 5% from the true value, to less than 3% bias.

We extended the electronic reporting to all Lab & X-ray Units. The reporting format and the improvement in turnaround time were generally well received. The initial transmission difficulties are mostly overcome. Substantial savings are being realized in postage costs.

CALHAM PROVINCIAL LABORATORY
METABOLIC DISEASE FINDINGS
1987-1988

	IDENTIFIED IN 1987-1988	TOTAL FROM 1965 TO MARCH 31, 1988
PKU	1	20
GALACTOSEMIA	-	5
GALACTOSEMIA VARIANTS	1	10
PROLINEMIA	-	3
HISTIDINEMIA	1	19
MAPLE SYRUP URINE DISEASE	-	2
TYROSINEMIA	1	2
HYPOTHYROIDISM	1	29
TBG DEFICIENCY	-	2
CYSTINURIA	1	9
GLYCINEMIA	-	1
HARTNUP DISEASE	1	6
TOTALS	7	108

CADHAM PROVINCIAL LABORATORY DIAGNOSTIC CHEMISTRY SECTION
YEARLY STATISTICAL ANALYSIS
April 1st, 1987-March 31st, 1988

TEST NAME	LAB CODE #	NO. OF PATIENTS	NO. OF CONTROLS	NO. OF STANDARDS	NO. OF REPEATS	TOTAL NO. OF TESTS	UNIT VALUE	TOTAL UNITS
CHOLESTEROL (TOTAL)	00498	3,491	534	727	200	4,952	4	19,808
HDL-CHOLESTEROL		1,204	307	313	83	1,907	5	9,535
TRIGLYCERIDES	00984	2,838	690	360	52	3,940	3 (IF NO CHOL.RUN ON SAME SPEC.)	3,940
IRON AND TIBC	00650	427	116	70	30	643	15	9,645
IRON	00648	62	16	5	44	127	10	1,270
THYROXINE (T4)	00978	3,674	387	714	76	4,851	7	33,957
T3 UPTAKE	00977	1,167	343	107	22	1,639	7	11,473
TSH	00975	2,169	298	784	40	3,291	7	23,037
VIT. B12 AND FOLATE	01050	618	177	432	15	1,242	7	8,694
DIGOXIN	00313	1,006	530	156	87	1,779	4	7,116
THEOPHYLLINE	00312	458	435	126	37	1,056	3	3,168
CHOLINESTERASE	00497	165	54	4	2	225	3	675
GLYCATED HEMOGLOBIN	01054	1,294	191	0	55	1,540	12	18,480
YEAR TOTALS		18,573	4,078	3,798	743	27,192		150,798

MATERNAL SERUM AFP SCREENING

TEST NAME	PATIENTS	STD Q.C. INT. RPT.	2nd SPEC.	TOTAL TESTS	TOTAL UNITS
AFP	5,595	3,042	678	9,315	65,205

CADHAM PROVINCIAL LABORATORY

INFECTION CONTROL PROGRAM - LONG TERM CARE FACILITIES AND RURAL HOSPITALS

This program is provided to assist rural hospitals and long term care facilities in the establishment of infection control programs and in the training of infection control practitioners. Ongoing consultation and continuing education services are included.

One hundred and six facility visits were made during which 70 continuing education sessions were provided. Attendance totaled 1509 and, as in the previous year, AIDS accounted for half of the requests. Various other infection control or infectious diseases topics were presented.

Telephone consultations addressed a host of questions and numbered 289.

Four two-day training courses were provided for 21 hospital and 39 long term care employees.

Mighty Microbes, an information bulletin continues to be popular and was introduced for long term care infection control practitioners as well. They received two issues and hospitals received four.

Liaison with other agencies continues to expand including the VON, Community Therapy Services, Kenya AIDS Program, B.C. Long Term Care Association, ear-piercing clinics, etc.

Miss Phippen attended the CHICA National Convention, the Continuing Medical Education AIDS Update and completed the Certification Board of Infection Control examination to become Certified in Infection Control.

RURAL LABORATORY AND X-RAY UNIT SYSTEM (LAXUS)

The rural Laboratory and X-ray Services Unit System continued to provide diagnostic services in medical laboratory technology, radiology, diagnostic ultrasound, and electrocardiography, in 75 Manitoba health facilities, all but one in rural and northern areas.

LABORATORY

Quality Control Programs

The Division continues to monitor and ensure quality of laboratory analysis by participating in the following internal and external Quality Assurance Programs.

Those offered by the Quality Control Section of the Cadham Provincial Laboratory:

a. A Quality Control program for monitoring pregnancy testing and infectious mononucleosis testing.

b. Microbiology - a comprehensive Gram staining, sensitivity testing and culture identification Quality Control program for the participating Laboratory and X-ray Units.

External Quality Control programs participated in are:

a. Commercial Hematology control cells (internal program on all electronic cell counting apparatus).

b. The Regional Hematology Quality Control program which includes the dissemination of whole blood samples on a defined area basis and subsequent collation of area statistics.

c. Ames Urinalysis program.

d. The Fisher Diagnostics "Accutrak" computerized chemistry quality control program monitors the chemistry program.

e. All Units continue to participate in the College of American Pathologists Inter-laboratory Comparison program.

f. All Units involved with Blood Bank Procedures are monitored by the Quality Control protocol developed and administered by the Canadian Red Cross.

LABORATORY - WESTERN REGION

The 1987/88 fiscal year saw a great deal of activity in the Western Region laboratory section including the installation of new equipment and procedures, completion of construction projects, continuing education, and improved safety procedures.

The addition of ion selective technology to existing analyzers at Swan River, Dauphin, The Pas, and Flin Flon, now enables the laboratories to perform most routine chemistries with a minimum of sample handling and improved accuracy and precision.

A fully automated six parameter hematology analyzer with a through-put of 60 samples per hour was installed at Ste. Rose to handle the workload in this busy laboratory.

State-of-the-art chemistry and/or hematology analyzers were purchased and installed at Lynn Lake, Leaf Rapids, Grandview, McCreary, Rivers, Rossburn, and Baldur, enabling the expansion of new procedures performed locally.

Transfer of chemistry analyzers to Minnedosa, Hamiota, Virden, and Deloraine, saw expansion of the local chemistry programs, with improved performance.

New programs included the installation of Blood Gas Analyzers at Souris and Hamiota, and theophylline assays at Killarney.

In keeping with current safety standards, the Division implemented a policy whereby staff working with biological materials are required to wear protective gloves. Disposable plastic transfer pipets have replaced the glass type to obviate potential problems associated with broken glass. Current specimen transport containers are being replaced with a type which is less prone to leakage. Twenty-one safety centrifuges were purchased and installed in various laboratories throughout the region. A safety hood was installed at The Pas. Problems relating to ventilation and noise were investigated and resolved at Flin Flon and Dauphin respectively. The disposal of biological waste material has been updated to established standards at Rivers, Boissevain, Souris, and Grandview.

Various instruments, disposables and reagents were evaluated relating to automated hematology, pregnancy testing, coagulations, routine urinanalysis, therapeutic drug monitoring and sample handling.

In the management of chronically ill patients, certain tests are carried out by nursing staff, e.g. diabetes. As of December 1987, the laboratory has become involved in the quality control of these "off-base" test procedures. The results of this program are monitored by a Quality Assurance Committee with representation from the laboratory as well as nursing staff.

The Division supported staff attendance to various technical and life skill seminars by allowing time off and reimbursement of registration fees. The Development and Training Branch of the Civil Service Commission has put together a program for various regions outside of Winnipeg - e.g. Dauphin, Brandon, The Pas, and Portage. This regional approach has made courses available to a greater number of staff at a reduced cost in terms of travel time and other expenses.

Construction of new laboratory facilities were completed at Grandview and Souris.

Efforts in the coming fiscal year will be directed to upgrading of instrumentation and procedures throughout the region, with an emphasis on replacement of existing manual procedures.

LABORATORY - EASTERN REGION

New Activities

The Strep I.D. test has been introduced to the majority of the Laboratory and X-ray Units in the Region enabling rapid and on-site diagnosis of Group A streptococcal infection.

The on-site program of therapeutic drug monitoring (theophylline testing) has been developed and introduced at Morden, Portage la Prairie, and Selkirk. The current test protocol utilizes Dupont reagents and the Hoffman LaRoche Cobas Mira analyzer.

A major change occurred this year in the Urinalysis testing protocol. The Divison has changed the testing method to the use of the Multistix 10 S.G. procedure. This includes 10 tests (glucose, bilirubin, ketones, blood, pH, protein, urobilinogen, nitrite, leukocytes, and specific gravity) all on one reagent strip.

Another change has been in the stat and bedside glucose monitoring proecdure. Currently the Glucostix test system is in use and is compatible with visual or meter reading of test results.

The use of the above urinalysis test procedure has enabled us to place four semi-automated test strip reading instruments at Portage, Selkirk, Gimli, and Steinbach.

Two other areas that saw changes this year were coagulation testing (Prothrombin-time, and Activated Partial Thromboplastin time) and Infectiuos mononucleosis screen testing. The procedures are slightly varied from previously and we use a different source of supply.

There has been a major revision to the Consumable Supplies Catalogue as it relates to our Divisional Central Warehouse and distribution systems. In addition to format changes with additions and deletions of various products, the whole process is now on the Word Processor which has greatly enhanced the revision process.

The Capital Equipment inventory records have been revised and updating initiated. The updated records are currently in the process of being computerized for storage and retrieval.

The process for the on-site staffing and diagnostic functions were initiated for the St. Claude Laboratory and X-ray Unit. It is

anticipated that renovations to the Unit will be complete, so that equipment set-up and staffing could be accomplished by early summer 1988.

A Divisional Gloving Policy (use of disposable gloves) was developed and instituted throughout LAXUS.

Upgrading of Systems

Flame photometers for the analysis of serum and urine electrolytes (sodium and potassium) have been installed at Arborg and Gillam.

A Ciba Corning ISE (ion selective electrode) electrolyte analyzer was installed at the Morris laboratory.

An ISE module compatible with the Hofmann LaRoche Cobas Mira chemistry analyzer was installed at the Portage la Prairie Laboratory.

The Instrumentation Laboratory Cellect-8 hematology microcell analyzer was installed at the Steinbach, Morden, and Gimli laboratories. This instrumentation has the whole blood sampling capability and eight simultaneous analysis are performed - hemoglobin, hematocrit, red cell count, white cell count, platelet count and the three red cell indices - MCH, MCHC, and MCV.

Safety centrifuges with aerosol containment capability were installed at 16 laboratories in the region.

Refrigerator/freezer functions were upgraded at Vita and Lac du Bonnet.

Microscopy functions were expanded at St. Pierre and Pine Falls.

Research and Development

The Ortho Coagulab 16-S and the Coagumate XC (Organon/Technica) coagulation instrumentation were evaluated at the Steinbach Laboratory.

The Portage la Prairie laboratory evaluated the Cobas Mira Ion Selective Electrode Analyzer Module and the Nova 11 Ion Selective Electrode electrolyte analyzer system. The Cobas Module was subsequently installed.

The Morris Laboratory performed an extensive evaluation on five ISE electrolyte analyzers - Dupont, Ketone, Lytening IL, Ciba Corning and Eskalab. The instrument of choice with subsequent purchase was the Ciba Corning model 614 analyzer.

The Cadham Provincial Laboratory Chemistry Department evaluated the Boehringer Mannheim Reflatron chemistry analyzer on behalf of Laboratory and X-ray Services.

Selkirk and Portage la Prairie Laboratories evaluated the Beckman and Sigma Diagnostic reagent systems for the full routine chemistry menu on the Cobas Mira Analyzer.

The Gimli Laboratory conducted an evaluation of the Sigma Diagnostics reagent system for the Electro Nucleonics Gemini analyzer.

An evaluation of a new brand of autoclave bags was conducted at the Cadham Provincial Laboratory and Portage la Prairie Laboratory.

The Portage la Prairie and Morden Laboratories evaluated six brands of vinyl and latex disposable gloves.

The Cadham Provincial Laboratory conducted an evaluation of the screening test for Infectious Mononucleosis and the Urine dip slides from the various manufacturers.

The Selkirk Laboratory conducted an evaluation of two makes of electronic differential cell counters.

The Portage and Selkirk Laboratories conducted an evaluation of a plastic variety of vacutainer tubes.

Construction and/or Renovations

Construction/renovations are to begin in Manitou.

St. Claude is currently in the renovations stage.

Portage la Prairie, Stonewall, Beausejour, St. Pierre, and Vita are currently at the functional program stage.

Construction/renovations are currently at the discussion stage for Notre Dame.

RADIOLOGY - WESTERN REGION

The preventive maintenance program for electrocardiography equipment continues in the Western Region with twenty Units receiving a mechanical, electrical and safety inspection over the fiscal year.

X-ray Quality Control was expanded this year with the purchase of equipment for The Pas and Flin Flon facilities to enable them to do Level II monitoring of equipment. This will allow them to better assess radiation exposure and beam limiting factors.

A support program for the PAKO 14X Series radiographic film processors has developed over the years in our Virden Department under the auspices of Mr. P. Rocan, Area Chief Technologist. This program has incorporated bulk ordering for the region to take advantage of the economies of scale and to facilitate the prompt supply of parts to regional departments. Local resources have been also developed to

rebuild motors, blowers and processor racks, which has resulted in a major component exchange program for an ever-expanding number of departments in the service.

A new monthly report form for capturing statistics for electrocardiographic workload measurements was developed. It has been introduced for province-wide use commencing the beginning of the 1988/89 fiscal year.

Colour-coded x-ray patient files were purchased for the Dauphin department in 1987. This is a major project converting the approximately 37,000 patient files over from the existing chronological order numbering system and is expected to take approximately two years to complete.

The Killarney and Virden Areas conducted a long-term field trial on a new electrolytic silver reclamation product this fiscal year. Electrolytic reclaimers retrieve silver from the fixer solution of the automatic radiographic film processors. The equipment evaluated is geared toward the smaller volumes used in the majority of rural departments. In this field trial, permanent units were installed in Killarney and Souris with two portable recovery units shared amongst the other departments. The evaluation period will continue into this 1988/89 fiscal year.

Product Evaluation

Computer interpretive electrocardiographic equipment has been the subject of a great deal of interest by physicians and hospitals in the rural areas. This has prompted field trials or product evaluations to be done in Hamiota, Souris, Deloraine, Russell and Grandview on the Burdick E500, Burdick Elite, and the Marquette PC products. Deloraine Hospital used community donation funds to purchase a Marquette PC unit for use in the Deloraine department. Provincial Laboratory and X-ray Services is contributing by assuming responsibility for repair, parts, maintenance and consumables.

A Fuji countertop processor was evaluated by the staff in Souris with very positive reports resulting from it.

Further information and details on the above product evaluations are on file at the central office in Cadham Provincial Laboratory.

Early this year two electrocardiographic stress test systems were evaluated by the staff of the Dauphin and The Pas departments. The Burdick E700 system was field trialed in both Dauphin and The Pas, and the Marquette MAC system was viewed in Brandon. Following the product evaluations, two Burdick E700 systems were purchased and installed in Dauphin and The Pas. This equipment is purchased as part of a new program for The Pas Health Complex and is a replacement and upgrade for the Dauphin department. The Burdick system was selected on the basis of price vs. expected moderate workloads.

The Pas finally received a replacement to their worn out Kodak M7B processor with the arrival of a new Kodak M6B.

The Baldur and Glenboro staff were glad to have received in 1987 their long awaited conversion to automatic film processing. New low volume AFT 14TE processors were installed in August and September of 1987.

A new radiographic fluoroscopic suite was purchased for the Ste. Rose department with installation taking place in April 1988. The suite is a Raytheon RMS-RMX single phase system with closed circuit TV and linear tomography. This also introduces expansion of service to the Ste. Rose community with the introduction of fluoroscopy and radiologist's visitation service from Dauphin on a planned once per three week schedule.

The new Grandview Hospital opened for business in 1988 and it included excellent facilities for Lab and X-ray Services. Construction was on schedule with no problems at all in the lab and x-ray suite. The general radiographic equipment is an Elscint system consisting of a pedestal table with a four-way float and elevating top, single-phase generator and ceiling tube mount.

Souris moved into their renovated wing in the Fall of 1988. Renovations included a new patient waiting room, office, file room, and private radiologist's film viewing room. The reception, dark room and preliminary viewing areas were altered for improved workflow.

RADIOLOGY - EASTERN REGION

The total radiography examinations performed in the Eastern Region in 1987/88 were 99,368. This figure represents a decrease of 7% in comparison to the 1986/87 fiscal year-end total of 106,935.

Ultrasound examinations increased by 1% to 6,444 from the 1986/87 total of 6,388.

In Electrocardiography, the total number of examinations in the Eastern Region were 27,983. This represents an increase of 3% from the previous year's total of 27,133.

During the year ECG Procedure Guide was completely revised and issued to all Units. The Guide outlines basic steps in producing a 12 lead ECG tracing, recognition of common errors and artifacts, and quality control techniques.

The Divisional Policy and Procedures Manual was completely reviewed, revised, and upgraded and distributed to all Units.

Continued progress at various Units is being made on developing Patient Care Quality Control programs in conjunction with associated hospital programs.

Minor revisions were made to the X-ray Workload Measurement system. Major revisions are anticipated in the upcoming year to the X-ray Monthly Reporting Form.

The Steinbach Lab and X-ray Unit was equipped with two new radiographic suites in the spring of 1987. The CGR Prestilix 1600 Radiographic/Fluoroscopic/Tomograhic Unit features the latest in technological advances. The remote-controlled unit includes a high frequency three-phase controlled x-ray generator. Included is a bilateral overhead hanger and wall Bucky unit with automatic exposure control devices. The integrated tomographic device allows for multiple amplitudes, speeds and table angles for linear tomography, plus tomoscopy, a fluoroscopic/tomographic imaging mode.

The second room is equipped for radiographic examinations and includes a CGK floating top pedestal table, bilateral overhead tube hanger and wall Bucky unit. The Raytheon generator provides automatic exposure control.

The Whitemouth Lab and X-ray Unit's new facilities were equipped with a Bennett radiographic unit and wall Bucky unit. The Bennett x-ray generator features an automatic exposure control which is unique in the industry. The machine determines the patient thickness using a sonar-beam. This information is fed to an onboard computer with digital display that determines the exposure factors. All techniques are stored by the generator and this effectively eliminates technique charts. The equipment monitors self-tests of all functions, programs, and tube limits but also allows the technolgoist to override any exposure parameters.

X-ray film processors were purchased for the Vita, Selkirk Mental Hospital and Riverton Units as part of a continuing program to upgrade all Units from manual processing.

The Morden Department was equipped with an AFP 14X3-90 film processor to replace obsolete equipment.

The Carman Unit was supplied with a Philips Mobile Diagnost battery-operated unit as a replacement for an existing malfunctioning unit.

Refurbished wall Bucky units including automatic exposure control devices were installed at the Churchill and Pinawa Units to further upgrade their facilities.

The Winkler Ultrasound Department was equipped with a Fuji FT 1 Thermal Imaging Recorder to compliment the matrix camera.

Planning and Construction

Divisional staff were involved with Manitoba Health Services Commission Planning and Construction staff and various architectural

groups over the past year. Feasibility and initial planning has been completed on proposed new construction projects at the Portage General, Vita, St. Pierre, Beausejour and Stonewall Units. Architectural drawings are completed for the Manitou Unit.

The Steinbach Lab and X-ray Unit at the Bethesda Hospital opened a new two-room department in the Spring of 1987. The facility includes an Ultrasound department, ECG department, various offices, file rooms and radiologist preview and reading rooms.

The Whitemouth Lab and X-ray Unit was opened in November 1987. The Facility, designed for a one-person operation features internal access to all areas of the Department.

The Gillam Hospital experienced a major fire in January, 1988, that destroyed over three-quarters of the facility. Fortunately, the radiographic equipment received only smoke and minor water damage. The equipment was salvaged from the building, refurbished and re-installed in temporary quarters in less than three weeks. A special thank you to the staff that worked endless hours in re-establishing the Department.

Product Assessment

Over the past 12 months, assessments were made on a variety of electrocardiographic equipment. A new generation of machines are now available that provide 1, 3, 4, or 12 simultaneous channels of patient data and also provide an immediate on-site computer-generated analysis and provisional interpretation. The machines are all capable of storing 10-20 tracings in memory and are able to transmit all data to larger, central computer storage systems. All the machines tested also allow for input of patient demographics, medication, identification and history as well as self-test features.

Machines assessed included the Burdick E500 and E600, the Burdick E Scribe storage unit, the Marquette PC and Marquette 12 units, the Hewlett Packard 4765A intelligent unit and 600 C Management System and the Siemens Mingograph 740 unit.

WORKLOAD OF RURAL LAB. & X-RAY UNITS SYSTEM - APRIL 1ST, 1987, TO MARCH 31ST, 1988

	X-RAY EXAMINATIONS			X-RAY S.C. UNITS			LAB S.C. UNITS		
T	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT
ELL	3,018	506	2,512	104,089	23,577	80,512	183,845	67,428	116,417
LE	1,549	397	1,152	51,498	15,906	35,586	120,600	45,463	75,137
BURN	975	261	714	24,572	8,832	15,740	77,614	30,288	47,326
L LAKE	1,452	326	1,126	34,383	8,754	25,629	162,264	52,799	109,465
MIN	15,937	3,459	12,478	649,471	149,034	500,437	1,054,761	357,188	697,573
RT PLAINS	461	-	461	10,393	-	10,393	18,000	-	18,000
VIEW	1,430	308	1,122	36,718	10,530	26,188	114,203	29,991	84,212
EARY	977	118	859	24,860	3,359	21,501	80,784	23,706	57,078
IN	2,531	746	1,785	67,287	23,453	43,834	241,078	86,984	154,094
ROSE	4,966	1,149	3,817	130,526	34,603	95,923	414,592	193,447	221,145
IPEGGIS	977	311	666	24,963	8,705	16,258	66,335	34,735	31,600
WA	6,005	1,377	4,628	216,504	52,167	164,337	399,024	144,298	254,726
ERRY	1,338	198	1,140	35,895	6,923	28,972	145,996	47,679	98,317
RSON	1,100	219	881	27,947	7,291	20,656	67,573	25,905	41,668
STONE	1,807	336	1,471	61,898	12,637	49,261	147,398	45,775	101,623
EDOSA	2,842	519	2,323	107,346	20,054	87,292	166,763	67,076	99,687
AGE	12,178	2,328	9,850	427,455	93,719	333,736	857,796	280,147	577,649
REDUR	424	32	392	9,746	1,126	8,620	19,814	950	18,864
TOBA DEV. CENTRE	1,255	1,255	-	31,275	31,275	-	-	-	-
E DAME	958	265	693	24,039	8,782	15,257	83,419	21,298	62,121
CLAUDE	510	119	391	12,824	4,130	8,694	42,344	18,138	24,206
ERNE	1,366	200	1,166	53,343	9,106	44,237	142,140	39,371	102,769
ARNEY	4,731	876	3,855	144,909	25,462	119,447	317,638	95,609	222,029
IR	474	204	270	13,983	7,612	6,371	52,365	26,198	26,167
SEVAIN	2,106	470	1,636	49,212	12,815	36,397	159,606	48,152	111,454
RIGHT	272	35	237	7,955	1,041	6,914	32,150	8,159	23,991
TAL CITY	1,551	301	1,250	42,505	8,875	33,630	187,451	58,591	128,860
RAINE	2,121	397	1,724	64,980	15,090	49,890	199,662	67,660	132,002
TA	1,942	394	1,548	47,977	13,279	34,698	135,309	43,805	91,504
EN	5,228	1,238	3,990	174,191	45,296	128,895	581,247	156,655	424,592
NA	2,673	421	2,252	90,618	14,273	76,345	242,784	72,935	169,849
AN	4,256	1,273	2,983	150,669	45,538	105,131	274,600	100,384	174,216
SON	1,018	250	768	23,109	5,764	17,345	62,025	21,418	40,607
TUU	784	157	627	19,008	6,479	12,529	59,668	15,458	44,210
IS	2,546	402	2,144	69,236	12,207	57,029	223,201	77,045	146,156
LAKE	3,532	567	2,965	129,896	27,891	102,005	349,231	79,761	269,470
ER	4,696	1,310	3,386	111,047	25,015	86,032	311,656	168,566	143,090
RK	11,187	1,527	9,660	360,116	52,180	307,936	627,337	202,355	424,982
EJOUR	4,696	836	3,860	152,137	33,184	118,953	113,515	80,496	33,020
U BONNET	1,259	-	1,259	28,092	-	28,092	85,570	-	85,570
A	1,661	318	1,343	54,688	12,554	42,134	131,917	40,632	91,285
FALLS	2,971	573	2,398	75,357	14,928	60,429	222,430	96,178	126,252
RK M.H.C.	724	-	724	21,796	21,796	-	-	-	-
MOUTH	489	172	317	12,843	6,053	6,790	21,945	10,697	11,248
RIVER	7,620	1,551	6,069	262,001	56,799	205,202	403,775	159,115	244,660
O	254	67	187	8,031	2,157	5,874	14,256	5,938	8,318
	4,140	765	3,375	150,324	35,995	114,329	276,879	73,936	202,943
LVALE	1,449	283	1,166	38,843	9,971	28,872	94,455	34,436	60,019
TON	218	-	218	4,408	-	4,408	-	-	-
HALL	2,524	376	2,148	63,987	12,881	51,106	210,226	63,360	146,866
N	3,656	719	2,937	121,006	26,657	94,349	232,145	73,096	159,049
N	3,981	718	3,263	129,828	27,587	102,241	275,035	69,654	205,381
ON M.H. C.	1,062	960	102	22,515	20,581	1,934	-	-	-
TA	2,147	403	1,744	61,706	11,852	49,854	241,733	76,405	165,328
N	1,053	214	839	27,605	7,424	20,181	70,372	22,842	47,530
S	980	155	825	22,917	3,878	19,039	112,858	24,184	88,674
S	3,271	746	2,525	100,046	24,467	75,579	228,100	79,786	148,314
C	2,581	433	2,148	63,062	14,066	48,996	129,797	46,516	83,281
N	1,325	127	1,198	30,093	3,636	26,457	96,330	28,065	68,265
HILL	1,947	540	1,407	68,984	16,682	52,302	369,059	108,169	260,890
FLON	10,984	1,705	9,279	294,351	48,861	245,490	581,807	230,871	350,936
M	1,174	248	926	28,914	8,358	20,556	90,401	20,491	69,910
ERO	786	157	629	19,878	5,448	14,430	54,616	13,461	41,155
RAPIDS	1,009	72	937	30,135	2,551	27,584	74,486	11,109	63,377
LAKE	1,985	347	1,638	64,004	14,284	49,720	84,529	30,987	53,542
IERRE	3,314	728	2,586	116,368	31,920	84,448	135,022	57,474	77,548
ANNE	4,312	613	3,699	125,087	18,906	106,181	145,307	67,471	77,836
LAKE	822	9	813	17,770	260	17,510	50,795	4,431	46,364
BACH	6,922	1,089	5,833	254,322	44,798	209,524	455,051	143,418	311,633
NCE	355	-	355	7,853	-	7,853	-	-	-
AS	17,536	3,084	14,452	1,575,959	107,937	496,622	944,492	454,421	490,071
	1,040	232	808	25,792	7,019	18,773	72,817	26,628	46,189
ESA	1,064	140	924	24,435	4,176	20,259	86,339	11,415	74,924

TOTAL LAB S. C. UNITS - 14,528,333 IN/PAT - 5,021,099 OUT/PAT - 9,507,234
TOTAL X-RAY EXAMINATIONS - 214,484 IN/PAT - 43,355 OUT/PAT - 171,129
TOTAL X-RAY S. C. UNITS - 6,800,174 IN/PAT - 1,510,446 OUT/PAT - 5,289,728

MANITOBA OF RURAL LAB. & X-RAY UNITS SYSTEM - APRIL 1ST, 1987, TO MARCH 31ST, 1988

UNIT	ECG EXAMINATIONS			ECG S.C. UNITS			ULTRASOUND EXAMINATIONS		
	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT	TOTAL	IN/PAT	O/PAT
RUSSELL	778	302	476	20,866	8,452	12,414	-	-	-
BIRTLE	666	281	385	18,892	8,586	10,306	-	-	-
ROSSBURN	276	117	159	7,496	3,346	4,150	-	-	-
SHOAL LAKE	606	284	322	16,732	8,360	8,372	-	-	-
DAUPHIN	6,497	2,553	3,944	178,044	73,010	105,034	2,657	314	2,343
GILBERT PLAINS	126	-	126	2,860	-	2,860	-	-	-
GRANDVIEW	421	145	276	10,936	3,708	7,228	-	-	-
MOOREARY	295	69	226	7,902	2,026	5,876	-	-	-
ROBLIN	1,218	712	506	33,668	20,456	13,212	-	-	-
STE. ROSE	1,416	595	821	39,601	17,626	21,975	-	-	-
WINNIPEGOSIS	410	242	168	10,980	6,596	4,384	-	-	-
NEEPAWA	2,561	1,046	1,515	69,218	29,850	39,368	-	-	-
CARBERRY	772	203	569	20,278	5,120	15,158	-	-	-
ERICKSON	335	103	232	8,998	2,918	6,080	-	-	-
GLADSTONE	435	189	246	11,726	5,322	6,404	-	-	-
MINNEDOSA	839	316	523	22,576	8,808	13,768	-	-	-
PORTAGE	4,416	1,805	2,611	99,697	33,548	66,149	-	-	-
MACGREGOR	170	20	150	4,254	484	3,770	-	-	-
MANITOBA DEV. CENTRE	-	-	-	-	-	-	-	-	-
NOTRE DAME	229	121	108	6,082	3,274	2,808	-	-	-
ST. CLAUDE	196	65	131	5,104	1,698	3,406	-	-	-
TREHERNE	381	152	229	10,314	4,360	5,954	-	-	-
KILLARNEY	956	275	681	26,352	8,128	18,224	-	-	-
BALDUR	153	111	42	4,836	3,720	1,116	-	-	-
BOISSEVAIN	817	348	469	21,545	9,372	12,173	-	-	-
CARTWRIGHT	61	5	56	1,422	138	1,284	-	-	-
CRYSTAL CITY	489	230	259	13,546	6,812	6,734	-	-	-
DELORAINE	748	298	450	20,504	8,804	11,700	-	-	-
MELITA	504	220	284	14,648	7,164	7,484	-	-	-
MORDEN	1,753	684	1,069	47,931	21,484	26,447	-	-	-
ALTONA	745	236	509	14,938	4,936	10,002	-	-	-
CARMAN	1,065	472	593	33,158	15,988	17,170	-	-	-
EMERSON	384	96	288	9,984	2,496	7,488	-	-	-
MANITOU	190	62	128	5,436	2,108	3,328	-	-	-
MORRIS	1,307	691	616	27,864	12,424	15,440	-	-	-
SWAN LAKE	1,316	222	1,094	34,216	5,772	28,444	-	-	-
WINKLER	1,231	880	351	32,006	22,880	9,126	2,762	159	2,603
SELKIRK	2,615	1,008	1,607	70,606	26,603	44,003	2,267	138	2,129
BEAUSEJOUR	687	497	190	17,862	12,922	4,940	-	-	-
LAC DU BONNET	416	-	416	10,560	-	10,560	-	-	-
PINAWA	511	303	208	13,286	7,878	5,408	-	-	-
PINE FALLS	858	405	453	23,718	11,940	11,778	-	-	-
SELKIRK M.H.C.	-	-	-	-	-	-	-	-	-
WHITEMOUTH	195	89	106	5,070	2,314	2,756	-	-	-
SWAN RIVER	2,055	789	1,266	55,106	21,790	33,316	360	41	319
BENITO	125	45	80	3,250	1,170	2,080	-	-	-
GIMLI	1,644	595	1,049	42,000	15,124	26,876	-	-	-
ERIKSDALE	440	202	238	10,812	4,768	6,044	-	-	-
RIVERTON	-	-	-	-	-	-	-	-	-
STONEWALL	764	181	583	21,616	6,154	15,462	-	-	-
TEULON	845	305	540	24,230	10,190	14,040	-	-	-
VIRDEN	1,442	563	879	40,388	17,398	22,990	-	-	-
BRANDON M.H. C.	-	-	-	-	-	-	-	-	-
HAMIOTA	1,010	328	682	27,460	9,672	17,788	-	-	-
RESTON	347	105	242	9,350	3,018	6,332	-	-	-
RIVERS	406	60	346	10,738	1,712	9,026	-	-	-
SOURIS	1,413	351	1,062	40,194	12,084	28,110	-	-	-
ARBORG	563	295	268	17,422	9,654	7,768	-	-	-
ASHERN	427	122	305	10,894	3,908	6,986	-	-	-
CHURCHILL	446	204	242	10,028	4,164	5,864	-	-	-
FLIN FLON	2,537	668	1,869	69,842	19,760	50,082	-	-	-
GILLAM	231	101	130	6,610	3,022	3,588	-	-	-
GLENBORO	362	130	232	9,980	3,948	6,032	-	-	-
LEAF RAPIDS	163	49	114	4,664	1,700	2,964	-	-	-
LYNN LAKE	164	61	103	4,530	1,852	2,678	-	-	-
ST. PIERRE	772	426	346	20,073	11,077	8,996	-	-	-
STE. ANNE	729	319	410	20,458	9,790	10,668	-	-	-
SNOW LAKE	128	14	114	3,984	396	3,588	-	-	-
STEINBACH	1,985	575	1,410	56,210	19,550	36,660	1,415	110	1,305
SUNNIDGE	-	-	-	-	-	-	-	-	-
THE PAS	3,555	1,483	2,072	88,892	36,830	52,062	2,400	367	2,033
VITA	472	212	260	13,968	7,208	6,760	-	-	-
WANANESA	443	81	362	11,616	2,144	9,472	-	-	-

TOTAL E.C.G. EXAMINATIONS - 63,512 IN/PAT - 24,716 OUT/PAT - 38,796
TOTAL E.C.G. WORK UNITS - 1,690,027 IN/PAT - 679,514 OUT/PAT - 1,010,513
TOTAL ULTRASOUND EXAMINATIONS - 11,861 IN/PAT - 1,129 OUT/PAT - 10,732

LAB MEDICINE EDUCATION

GENERAL:

Laboratory Medicine Education (LME) is administered and co-ordinated from the Cadham Provincial Laboratory for the entire Division by the Co-ordinator of LME.

Dr. Williams and invited specialists continued the Division's on-site visitations. While at these visits, formal and informal presentations are delivered to rural physicians, technologists, auxiliary staff and the public. Forty-two such presentations were made on topics such as: Street Drugs, AIDS Update, Hepatitis, The Mechanics of Accidents in Childhood, Herpes VI, Otitis Media, Infectious Disease Symposium, and Genetic Counselling. In all, 514 individuals attended: 281 physicians, 109 technologists, and 124 others. The Division is highly appreciative of the contributions made by the visiting specialists.

Continued use was made of distant educational programs acquired from various sources. These programs may consist of a text, visual slides, audio-tapes, video-tapes or combination packs. Each program covers a specific topic related to laboratory medicine and may run up to one hour. The programs can be studied by individuals or in groups, at minimum cost to the Division, and at maximum convenience to the participants. During the year, 121 staff utilized these programs.

In order to facilitate the use of these and other resources, a catalogue of CE-Resources available to our technologists was developed by the CLME. One is in place at each Lab & X-ray Unit.

LABORATORY ASSISTANTSHIP TRAINING

The Division continued to conduct a 12-week program to train selected Registered Radiological Technologists in basic laboratory medicine. In this program candidates receive six weeks intensive didactic training followed by six weeks of guided practice in one of our rural Units. One candidate graduated from this program. We are indebted to Myrla Smederovac and Pat Bird, who conducted a large part of the didactic program, and to the staff of the Pinawa Health Centre, who assisted with the training of this student.

INSERVICE TRAINING:

This area of training is categorized in six distinct formats:

1. Reviews on routine procedures by staff, particularly to new staff and to summer students.

2. Introduction of new tests or instruments. This may involve:

a. Familiarization by a sales representative or senior staff.

b. A pre-test as a guide to basic relevant knowledge.

c. Practice under supervision and guidance of an instructor.

d. A practical test to demonstrate procedural competence.

e. A post-test to demonstrate an understanding of principles, applications and pitfalls.

3. Lectures or seminars presented by senior staff or invited guests. These are usually broad topics of interest to all or several laboratory sections.

4. Presentation and review of current articles by designated staff members.

5. Short programs that are sent to individuals or groups, and that can be learned on-site without help from an Instructor.

6. Formal programs that require indepth involvement and longer time commitments from both the participant and an instructor - e.g., re-training staff.

Specific activities under categories 2, 3, and 4 are listed below. The numbers in brackets represent the number of staff in attendance at the respective session. All were one hour each unless otherwise indicated:

CPL SEMINARS:

New Trends in Forensic Pathology - Dr. P. Markesteyn	(39)
The Context of Modern Vaccine Development - Dr. F. A. Murphy	(57)
Influenza Epidemiological Perspectives from Cirencester - Dr. R. E. Hope-Simpson	(63)
SL-1 Business Communicator - Mr. Dan Zaretski	(31)
Manitoba AIDS Virus Epidemiology - Dr. G. Hammond	(73)
Hospital Infection Control in Rural Manitoba - Ms. Diane Phippen	(43)
Infectious Disease Surveillance in Winnipeg - Dr. D. Luckhurst, et al.	(47)
The Alpha Feto Protein Program Study - Dr. J. Evans	(53)

OTHER CPL SESSIONS:

Nine Journal Reviews - Various Staff Members	(216)
Eight Research Reviews - Various Staff Members	(183)
Two Safety Seminars - A Delaat (two hours)	(21)
Two Teleconferences - Abbott Laboratories	(59)
Two Motivation - Videos	(34)

RURAL SESSIONS:

AIDS Update - The Pas (2 hours)	(17)
EKG - Interpretations - The Pas (3 days)	(6)
Anatomy and Physiology - Hodgson - Correspondence	(1)
Health Care Administration - Hodgson - Correspondence	(1)
Visit to CPL for Update (1 day)	(3)
Urine Microscopy - Various locations (3 hours)	(24)
Urinalysis by Correspondence - Various Locations	(8)
Diabetes and Genetic Counselling - Flin Flon (1 hour)	(6)
Electrolytes - Flin Flon (1 hour)	(7)
Misc. - Lifestyle Topics - Flin Flon (1 hour)	(18)
Written Communications - ACT - Workshop (4 hours)	(13)
Misc. Technical Topics - Various locations (1 hour)	(29)
RBC - Morphology - Various locations (3 hours)	(17)
Infant Failure to Thrive - Portage la Prairie (3 hours)	(8)
Lifestart - Portage la Prairie (2 hours)	(9)
Labour Relations - Portage la Prairie (1 hour)	(16)
Streptokinase Protocol - Portage la Prairie (1 hour)	(15)

EXTRAMURAL TRAINING FOR THE DIVISION:

Several staff members received assistance to partake in extramural training programs, or supported themselves in such activities:

Chemical Hazards in the Workplace (2 days)	(2)
AIHA - Symposium - Winnipeg (1 day)	(1)
CACMID - Ottawa (5 days)	(2)
CSLT - Congress - Hamilton (1 week)	(4)
International Papilloma Workshop - Washington (1 week)	(1)
CSLT - Telenars (1 hr)	(31)
AIDS Update - Several locations (1 hour)	(57)
Normalt - Conference - The Pas (3 hours)	(15)
Pembina Valley Conference - Carman (6 hours)	(35)
Misc. - Management Topics - Various locations (1 hour)	(9)
Epidemiology - UM - Certificate (30 hours)	(1)
Urinalysis Workshop - Winnipeg Academy (6 hours)	(23)
Microbial Physiology - UM - Certificate (30 hours)	(2)
Pembina Academy Sessions (1 hour)	(54)
Microbiology Update - SAIT (60 hours)	(1)
Conference on Drug Testing, AACC, Chicago	(1)
Symposium on Engirex B, Montreal	(1)
Clinical Virology Course, UM	(6)
Introductory Physics - UM	(1)

Legend:

AIHA	- American Industrial Hygiene Assocation
UM	- University of Manitoba
CSLT	- Canadian Society of Laboratory Technologists
AACC	- American Association of Clinical Chemists
SAIT	- Southern Alberta Institute of Technology

EXTRAMURAL TEACHING FROM THE DIVISION:

A number of our staff continued to contribute a significant amount of their time to teaching at the University of Manitoba Medical and Dental Faculties. These activities include lectures, seminars, tutorials, rounds and laboratory sessions in a variety of health-related programs.

Some entire courses are coordinated by Division staff:

Clinical Parasitology - 97:714 - Department of Medical Microbiology, University of Manitoba, Dr. L. Sekla - Coordinator and Instructor.

Clinical Virology - 97:713 - Department of Medical Microbiology, University of Manitoba, Dr. G. Hammond - Coordinator and Instructor, 11 students.

Radiology 103.114 - Faculty of Dentistry and Radiology 70:212 - School of Dental Hygiene, Dr. D. Gelskey - Coordinator and Instructor.

Two graduate students are being supervised by our staff:

Mr. T. Scott-Taylor, Ph.D. student, by Dr. Hammond
Mrs. R. Kilani, Ph.D. student, by Dr. Sekla

Lab rounds are a weekly feature at the CPL, and review the medical use of diagnostic technology, specimen collection, and test interpretation. Twenty-one rounds were conducted at the CPL for infectious disease fellows, residents, interns and medical students. The rounds were presented by: Messrs. Stackiw, Klisko, Koschik, Ahluwalia, Barker, Milley and Kan, Drs. Maniar and McNicol, Mrs. Eibisch, Dzogan, Winther, Giercke, and Miss Pugh.

Several other graduate students rotated through various departments of the CPL for varying periods of time:

Dr. P. Jessamine - Virology - 6 weeks
Dr. M. Louie
Dr. B. Toye - Infectious Disease Schedule - 1 month each
Dr. N. Lesaux
Dr. A. Tobaiqui - Community Medicine Rotation - 1 month

Fifty students from the Water and Waste unit of the City of Winnipeg visited the CPL, focusing on Environmental Microbiology. Conveners were Mr. Stackiw, Mr. Milley, Ms. Pugh, and Mrs. Winzinowich.

One Red River Community College Instructor received upgrading in Clinical Microbiology.

Two "Open Houses" were conducted at the Portage Laboratories and at the CPL.

Twenty-four Med. Lab. Students from Red River College visited the CPL with their teachers.

Many other presentations were delivered to outside groups. Some of the more noteworthy were:

Delaat, A. N. C.

- Laboratory Acquired Infections: - National Congress - CSLT, Hamilton
  - Pembina Academy - MSMLT - Carman
  - Thompson Health Centre - Thompson

- Written Communication - 4 day Workshop, Civil Service Commission, Winnipeg

- Developing Reports - 4 day Workshop, Civil Service Commission, Winnipeg

- Laboratory Tests for AIDS: Winnipeg Adult Educators - Winnipeg (24)

- Introduction to CPL: St. Boniface Hospital School of Med. Technology

Hammond, Dr. G. W.

- AIDS Update - Grace General Hospital
  - Misericordia General Hospital

Phippen, Diane

- Alberta Association of Registered Nurses - "Future Directions in Infection Control."

- Manitoba Association of Licensed Practical Nurses - "Interpreting Lab Results."

- LTCF Nursing Administrators Annual Meeting - "Infection Control in Long Term Care."

- Manitoba Association of Registered Nurses - Tranquility Chapter - "AIDS".

- Misericordia Hospital - "AIDS in Rural Manitoba."

- Community Therapy Services Annual Inservice - "Infection Control in Physiotherapy and Occupation Therapy."

- Glenlawn School - "AIDS"

- St. Adophe Y-Mothers - "AIDS"

- CPL-LAXUS Rounds - "Provincial Infection Control Program."

Miss Phippen also attended the CHICA National Convention, the Continuing Medical Education AIDS Update and completed the

Certification Board of Infection Control examination to become Certified in Infection Control.

Sekla, L.

- Sigma XI. The Scientific Society - "AIDS: Emerging Issues Related to Screening."

ABSTRACTS PRESENTED:

1. Selin, L. K., Hammond, G. W., Aoki, F. Y. Neonatal Herpes Simplex Virus Infection in Manitoba, 1980-1986. Presented at the College of Physicians and Surgeons of Canada Annual Meeting, Winnipeg, Manitoba, Sunday, September 15th, 1987, Abstract #RO308.

2. Conway, B., Hammond, G., Sekla, L. Seroprevalence of HIV infections in Manitoba. Presented at the Royal College of Physicians and Surgeons of Canada Annual Meeting, Winnipeg, Manitoba, September 12th, 1987.

3. Guijon, F., P. McNicol, and R. Brunham. 1987. Association of cervical intraepithelial neoplasia with Human Papillomavirus infection. Canadian Workshop on Papillomaviruses. Hamilton, Ontario, May 1-4.

4. Manitoba AIDS Virus Epidemiology Study Group* (*includes Dr. G. Hammond). Seroprevalence Survey and Risk Factor Assessment of HIV Infections in Manitoba. Presented at the Conjoint Meeting on Infectious Diseases, Ottawa, Ontario, November 23rd, 1987.

5. McNicol, P. J., Dodd, J. G. Human papillomavirus infection of the human prostate. 6th International Papillomavirus Workshop, Washington, D.C., June 16-20, 1987.

6. Sekla, L., Hammond, G. W., Stackiw, W., Eibisch, G. Diagnostic AIDS Testing in Manitoba. Presented at the Conjoint Meeting on Infectious Diseases, Ottawa, Ontario, November 23rd, 1987.

7. Sekla, L., Stackiw, W. Problems interpreting serological markers in the diagnosis of HIV infections in regions of low endemicity. First International Congress on AIDS, South Carolina 1987.

PUBLICATIONS:

1. Ahluwalia, G., Embree, J., McNicol, P. J., Law, B., Hammond, G. W. Comparison of nasopharyngeal aspirate and nasopharyngeal swab specimens for respiratory syncytial virus diagnosis by cell culture, indirect immunofluorescence and ELISA. J. Clin. Microbiol. 25:763, 1987.

PUBLICATIONS: (cont'd)

2. Artsob, H., Spence, L., Bishai, F., Kurjanczyk, L., Sekla, L. Amplified ELISA for the detection of Western Equine Encephalitis virus from mosquitoes in Manitoba. Can. J. of Virological Methods. 18:233-252, 1987.

3. Burroughs, M. W., Delaat, A, Fox, J. G., Matthews, J.: Editors, Divisional Newsletter - Volume 4, 4 Issues, 1987.

4. Fox, J. G. Experience of the Manitoba Perinatal Screening Program, 1965-1985. Canad. Med. Assoc. J. 137:883-888, 1987.

5. Hammond, G. W., Hannan, C., Yeh, T., Fischer, K., Mauthe, G., Straus, S. E. DNA hybridization for diagnosis of enteric adenovirus infection from directly spotted human fecal specimens. J. Clin. Microbiol. 25(10):1881-1885, 1987.

6. Kilani, R., Sekla, L. Purification of Cryptosporidium oocysts and sporozoites by Cesium chloride and Percoll gradients. Amer. J. Trop. Med. and Hyg. 36:505-508, 1987.

7. Lawee, D., Rosenthal, D., Aoki, F. Y., Portnoy, J., and the Cooperative Study Group* (* includes Dr. G. Hammond). Efficacy and safety of Foscarnet for recurrent orolabial herpes: a multicentre randomized double-blind study. CMAJ 138:329-333, 1988.

8. Mandell, L. A. (Moderator), Carlson, J., Gold, R., Hammond, G. W., Noel, G. E., Tamblyn, S. Workshop 8: Influenza in Canada. Amer. J. Med. 82 (Suppl. 6A):68-69, 1987.

9. Maniar, A. C., Williams, T. W., Hammond, G. W. Detection of Clostridium difficile toxin in various tissue culture monolayers. J. Clin. Microbiol. 25:1999-2000, 1987.

10. Minuk, G., Bowen, T., Sekla, L., Harding, G., Milton, L. The nature of antibody to HBsAg in high risk persons negative for other Hepatitis B viral markers. Am. J. Epidem. 126:44-49, 1987.

11. National Advisory Committee on Immunization*, Department of National Health and Welfare, Bureau of Communicable Disease Epidemiology, Laboratory Centre for Disease Control, Ottawa, Ontario (*includes Dr. G. Hammond). Statement on tetanus toxoid. CMAJ 137:734-735, 1987. , 1987.

12. Sekla, L., Hammond, G., Stackiw, W., Eibisch, G. Serodiagnosis of HIV in Manitoba. CDWR 14-2:5-7, 1987.

13. Sekla, L., Williamson, D., Greensmith, C., Balacko, G., Brown, D., Stackiw, W. Bacteriological characteristics of 15 freshwater beaches in Manitoba. Can. J. Publ. Hlth. 78:181-185, 1987.

PUBLICATIONS: (cont'd)

14. Sekla, L. Procedures for health care providers in Manitoba - HIV antibody testing. AIDS Care 1:1-2, 1987.

15. Sekla, L., Stackiw, W. Problem in interpreting serological markers in the diagnosis of HIV infections in regions of low endemicity. Archives of AIDS Research 1:343-352, 1988.

16. Sekla, L. Serodiagnosis of HIV in Manitoba. CDWR 14-2:5-7, 1988.

17. Sekla, L., Serology - then and now. Manitoba Medicine. 58(1):23-24, 1988.

VISITS TO OTHER LABORATORIES:

Fox, J. G., Chief Medical Examiner's Facility, Calgary, December 1987.

Dawood, M., Laboratory Centre for Disease Control, AIDS Section, Ottawa, March 1988.

CPL ARCHIVES:

An extensive search of the Manitoba Archives, the Legislative Library, and the Medical College Archives was undertaken by Mr. A. Delaat, in an effort to display pertinent documents at our 90th Birthday celebrations. The nucleus of the CPL Archives was thus established, and will be enlarged upon in years to come.

VOCATIONAL GUIDANCE:

Various staff members participated in career day activities at a number of high schools throughout the Province and at Regional Career Symposia, Winnipeg, Dauphin, Portage, and Morden. Career guidance was also provided to various staff members and summer students.

Dr. A. Maniar and Mr. A. Delaat served as judges at the Manitoba Schools Science Symposium finals in May, 1987.

SAFETY:

Twenty-one safety inspections were conducted in LAXUS Units.

The CPL Safety Manual was extensively revised and re-issued in 1987.

RURAL LABORATORY AND X-RAY UNIT SYSTEM (LAXUS)

EDUCATION - RADIOLOGY

R.T. Training

The Manitoba Health Services Commission X-ray Training School continued its program of training candidates for registration with the Canadian Association of Medical Radiation Technologists. The program involves 25 months of x-ray training plus three months of Laboratory Assistant Training.

During the 1987/88 fiscal year, three candidates were successful in passing the registration examination, and five senior students are progressing successfully in their clinical experience in both rural and city hospitals.

The five junior students enrolled in the theoretical portion of the program at Red River Community College, remain in training and are doing well.

The program is in its fourth year since revision. It consists of two-four month blocks of theory at RRCC, separated by one month of clinical experience in a rural hospital. The final block of theory is followed by return to rural hospitals for fifteen months of second year clinical training.

All training schools in Manitoba are preparing for an Accreditation Survey in the Fall of 1988.

X-ray Assistant Training

The Lab and X-ray Unit Systems sponsor selected Registered Medical Laboratory Technologists in a four month X-ray Assistant Training Program. This course is designed to train individuals to assist Radiological Technologists in covering emergency call-back situations in smaller rural hospitals.

Five students successfully completed the 1987 program.

Continuing Education

A number of in-service seminars and workshops as well as extramural lectures and conferences were attended by Divisional staff.

The following topics were covered at the respective locations with the figures in brackets representing the number of individuals in attendance.

Radiography

The Pas

Radiography of the Immobile Trauma Patient (audiovisual)	4 hours	(6)

Winnipeg

Low Dose Radiography	1.5 hours	(3)
Patient Care	6 hours	(3)

Saint John, New Brunswick

CAMRT Conference and Instructor's Seminar (numerous topics)	5 days	(1)

Chicago, Illinois

R.S.N.A. Conference (numerous topics)	3 days	(1)

Morris

Trauma Radiography - Skull, Facial Bones, Scapula, Patella	2.5 hours	(10)

Southern Region

Chest Radiography (audiovisual)	1 hour	(20)

Also, several Technologists are working on, or have completed, correspondence courses thorugh their professional association. The topics include: Pathology (3 sections), Quality Assurance (3 sections), Computers in Radiology, Cross-sectional Anatomy, Modern X-ray Equipment, The Effects of Radiation on Life, and Polishing Your Written Communication.

Electrocardiography

Winnipeg

Computer ECG Demonstration	2 hours	(10)
Arrhythmias and Cardiac Enzymes	4 hours	(1)

The Pas

ECG Seminar	1.5 hours	(3)
ECG Course	3 days	(1)

Miscellaneous Topics

Swan River

Oncology, Surgery, Cancers	4 hours	(4)
Respiratory Infections	1 hour	(5)
Street Drugs	1.5 hours	(6)
E.N.T. Problems	3 nours	(3)
Herpes Simplex	1 hour	(7)
Cost Effective Use of Antibiotics	1 hour	(7)
AIDS Update	1 hour	(7)
Sexual Abuse Investigation	1 hour	(7)
Newer Aspects of Child Abuse	2 hours	(4)
Genetics	1 hour	(2)
Diabetes Update	1 hour	(2)
Various Topics	6 hours	(2)

In addition, several departments held "Open House" days, for the public or as career investigation for school students.